Attachment B–1

HUDSON RIVER BIOLOGICAL MONITORING PROGRAM
2011 ICHTHYOPLANKTON SURVEY
STANDARD OPERATING PROCEDURES

NORMANDEAU ASSOCIATES, INC.
Bedford, New Hampshire

March 2011

2011 HUDSON RIVER ICHTHYOPLANKTON SURVEY STANDARD OPERATING PROCEDURES

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Submitted to
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Bedford, New Hampshire

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2011 Hudson River Ichthyoplankton Survey
Standard Operating Procedures

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I have read and understand this document.

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I. GENERAL INFORMATION

1.0 INTRODUCTION

The objective of the Hudson River Ichthyoplankton Survey is to provide ichthyoplankton samples which will allow calculation of standing crops and conditional mortality rates for selected Hudson River fish species including striped bass, white perch, Atlantic tomcod, and American shad. Past estimates of juvenile year class strength have used data from Hudson River Ichthyoplankton, Beach Seine and Fall Juvenile Surveys to estimate a combined standing crop for key species.

2.0 TECHNICAL APPROACH

2.1 HUDSON RIVER ICHTHYOPLANKTON SURVEY

Normandeau Associates Inc. (Normandeau) will collect between 92 and 208 ichthyoplankton samples per weekly survey (referred to as "river run" in this document) using epibenthic sleds and Tucker trawls during the 2011 Hudson River Ichthyoplankton Survey. The number of samples per river run varies throughout the year, and is typically lowest during the first three and last seven river runs. Sampling in each river run will be conducted within Hudson River Mile ("RM") 1 and RM 152 beginning during the week of 14 March 2011 and ending during the week of 3 October 2011, for a total of 23 river runs. Sampling sites will be randomly selected using Con Edison's Random Site Selector Program. River runs 1-10 will be collected during the day and river runs 11-23 will be sampled at night. All ichthyoplankton samples collected will be preserved in 10% formalin and stored by Normandeau until they are transferred to a contractor of Indian Point Energy Center's choice for laboratory analysis.

In conjunction with field collections, Normandeau will obtain water quality data from 64 fixed sampling stations during each river run. Normandeau will measure water temperature (to the nearest 0.1°C), dissolved oxygen (to the nearest 0.1 mg/l) and conductivity (to the nearest scale division) in situ at the surface, mid-depth and bottom for each of the 54 channel water quality stations, and surface and bottom for each of 10 shoal stations. YSI Model 33 temperature/conductivity meters, Model 57 dissolved oxygen meters and YSI Model 85 handheld oxygen conductivity, salinity and temperature systems (YSI Model 85) will be used to collect water quality data. The meters used will be checked prior to each sampling day against standards to maintain a quality control check of instrument performance and data quality. Along with water quality data, the sampling gear used, date and time of tow, river mile-site, GPS location, tow duration, river depth, sample depth and tow speed will be recorded on preprinted field data sheets.

Normandeau will enumerate all yearling and adult fish caught in the samples. Yearling and adult fish will be sorted into length classes in accordance with division length limits supplied to Entergy Ichthyoplankton and Juvenile Survey contractor. All markable striped bass and Atlantic tomcod will be examined for tags or finclips. Each yearling and adult fish will be released after the necessary data are obtained.

Normandeau will process all Atlantic and shortnose sturgeon in accordance with the terms and conditions of the Permit To Take Protected Species For Scientific Purposes Permit No. 1580.

3.0 QUALITY ASSURANCE

3.1 NORMANDEAU'S QUALITY ASSURANCE PROGRAM

It is Normandeau's policy to supply quality services, information, data, and products in a superior manner, at a fair cost and with timely delivery. To accomplish this policy, Normandeau has prepared and implemented a Quality Assurance (QA) Program that will provide a 10% average outgoing quality limit (AOQL) for all laboratory measurement parameters and a 1% AOQL for all data calculations, level files. Normandeau's Quality Assurance program has been designed to meet or exceed the guidance criteria of the U.S. Environmental Protection Agency and be consistent with the intent of federal regulations (10 CFR 50) which require that Quality Assurance be separated from operational and budgetary concerns. Normandeau has a full time Quality Assurance Director who supervises the implementation and documentation of QA Programs and reports directly to the President of the Company.

Normandeau's Hudson River Ichthyoplankton Survey Quality Assurance Program comprises two systems: a quality control (QC) system and a quality assurance (QA) system (Figure I-1). The principal strengths of the QA Program are the functional independence of the systems and the common collection and interpretation point for quality related information, the Quality Assurance Director. The QC system is managed by the Program Manager and conducted by operational personnel. The QA system is managed by Normandeau's Quality Assurance Director and utilizes project-independent technical personnel during performance and system audits.

3.1.1 Quality Control System

The function of the QC system is to continually monitor the reliability and validity (accuracy, precision, and completeness) of data produced on a daily basis. The QC system is approved by the QA Director and any changes to the procedures must be coordinated through Normandeau's QA Department and approved by a Entergy representative. For the Entergy Hudson River Ichthyoplankton Survey, a quality control supervisor will be appointed who will:

- monitor performance and results of quality control procedures
- monitor instrument maintenance, calibration, and reliability
- monitor document control and conduct audits of documentation resulting from sample analysis, instrument maintenance and calibration and data processing
- monitor sample control procedures and documentation
- monitor training of technicians.
- Sample Control Procedures

Specific sample control procedures including packaging, preservation and chain of custody for each task is documented in the *Sample Handling* elements of the Standard Operating Procedures Manual. In general, each sample is given a unique sample number. Each sample is then tracked by its sample number from field collection and throughout the laboratory and data processing functions. Daily collection of samples is tracked from the field site to the laboratory for final analysis by means of a Field Card/Sample Submittal Form. At the laboratory each sample is tracked through each storage and analysis step by means of sample control logs. The function of this system is to provide a paper trail of who performed each step in the analysis of a sample from collection to storage, when each step occurred, what condition the samples were in and where each step took place.

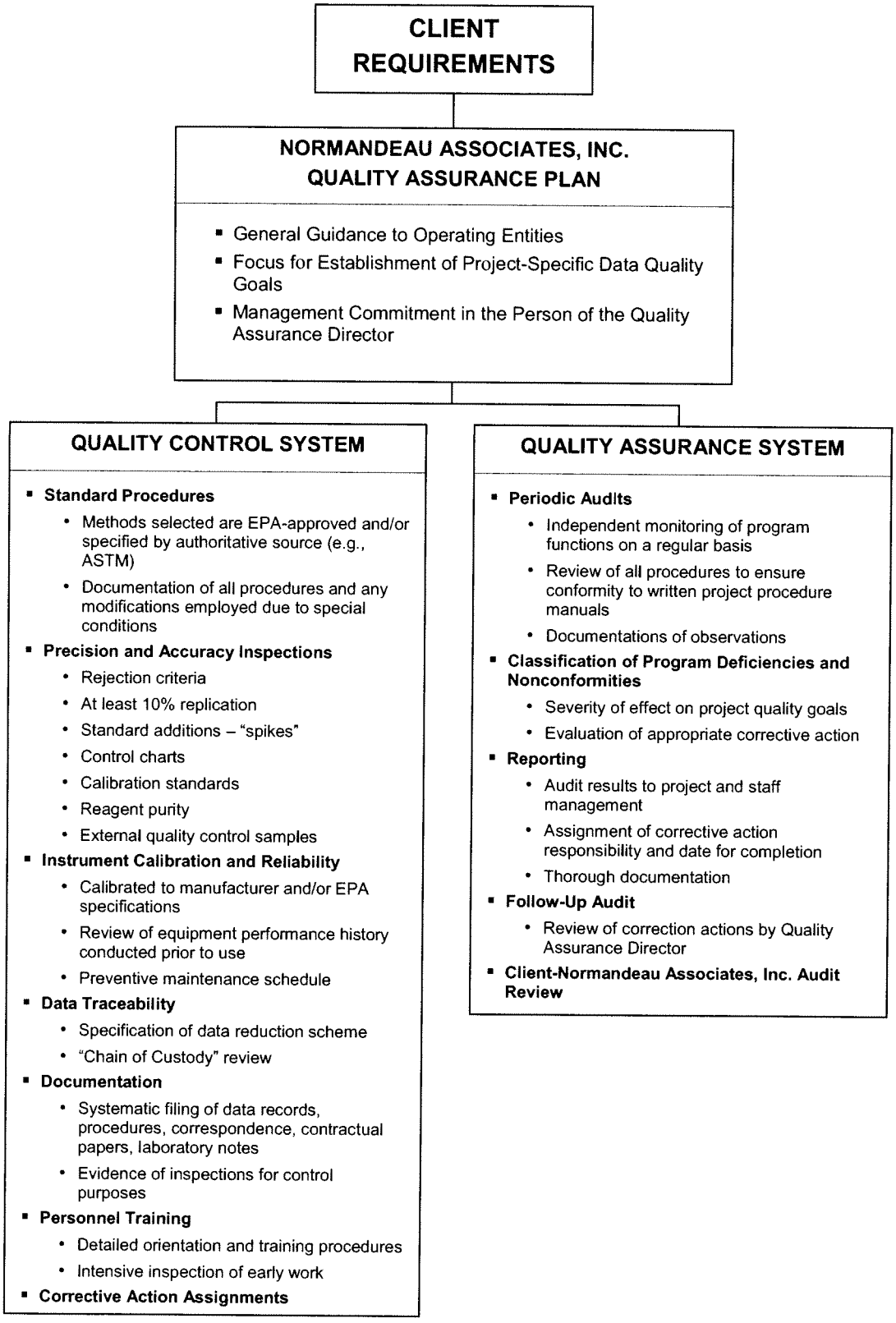


Figure I-1. Normandeau QA Plan.

All 2011 Hudson River Ichthyoplankton Survey samples will be preserved with 10% formalin and placed in Normandeau maintained heated storage rooms. All ichthyoplankton samples will be stored until January 2012 by which time it is expected they will have been released to a contractor of Entergy's choice for identification.

Data Control Procedures

Specific data control procedures including procedures on how to complete data sheets, storage and chain of custody, for each task is documented in the *Data Handling* elements of the Standard Operating Procedures Manual. In general, all completed data sheets are maintained in a master project file at the Bedford, NH, facility. At the Bedford, NH, facility each data sheet is tracked by means of data control logs. Each file is subject to periodic audits by the QA Department. The project files contain the following documentation:

- calibration records of all instrumentation
- procedures for all operations
- copies of all data sheets
- sample and data control logs
- data tabulations and working tables
- copies of all correspondence associated with the program
- copies of all official contracts and communications.

Instrument Calibration Procedures

The appropriate Quality Control Supervisor audits calibration procedures and approves calibration records of all instruments prior to use. Specific procedures for instrument calibration are documented in the *Instrument Calibration and Maintenance* elements of the Standard Operating Procedures Manual. These procedures include calibration schedules for each instrument, documentation of calibration results on standard calibration data sheets, and calibration to NIST traceable standards where possible. A calibration and maintenance log accompanies each instrument. The log includes:

- instrument number and identification
- date of calibration
- calibration due date
- initials of the person(s) calibrating the instrument
- standards used
- results, including instrument accuracy at receipt for calibration, adjustments made, instrument accuracy after calibration.

Field instrument calibration checks are performed prior to each day of use (Table I-1).

Table I-1. Field Instrument Calibration Frequency and Tolerance.

	Frequency of Calibration Checks	Tolerance
Conductivity	Daily	5% of Std
Temperature	Daily	3% of Std
Dissolved Oxygen	Daily	Checked against a D.O. saturation value for water bath at ambient temperature
Flowmeters	Weekly	± 15 m^3

Equipment Maintenance Procedures

Specific maintenance procedures for field and laboratory equipment are documented in the *Equipment Calibration and Maintenance* elements of the Standard Operating Procedures Manual. In general, equipment maintenance procedures include cleaning procedures and general parts replacement procedures along with maintenance schedules.

Training of Technicians

To assure the standardization of field, laboratory, and data processing procedures, Normandeau has developed a two level system for training technicians: the first level is documented standard operating procedures; the second level is a training program for all new project personnel. At a minimum, this training program consists of:

- A complete reading and explanation of the project Standard Operating Procedures Manual. This is documented by a sign-off sheet which is filed in the program file.
- The Program Manager, Ichthyoplankton Task Leader or Laboratory Supervisor will observe the first two or more times a new procedure is performed. This is documented with a signed checklist.
- Personnel assigned to unfamiliar tasks are accompanied by an experienced technician for at least their first two attempts.
- 100% quality control checks for at least the first five samples analyzed.
- On tasks requiring identification of fish, the Program Manager has final approval as to who is qualified to make these identifications. In some cases special training will be required to participate in tasks, as set forth by the Program Manager.

3.1.2 Quality Assurance System

It is the responsibility of the Quality Assurance Department to verify the achievement of quality through all phases of the project. Once the proposal, program design, and work development phases are complete, these responsibilities are accomplished primarily by audits, tests, and surveys which provide objective evidence that the quality control program and technical requirements, methods, and procedures as outlined in the program Standard Operating Procedures Manual are being implemented. All field, laboratory and data processing tasks are subject to at least one audit per year. These audits occur early in the program after the training phase has occurred. They are conducted by an audit team of technically qualified personnel familiar with, but independent of and not responsible for, the work

or activities under evaluation. The audit team reviews the operations, specifications, QC systems, plans, and project objectives and examines the acquisition and transfer of data from field to report.

Observations of nonconformities and program deficiencies are classified into three categories:

Class A: Nonconformities that WILL affect the data or the safety of personnel adversely.

Class B: Nonconformities that MIGHT affect the data or the safety of personnel adversely.

Class C: Nonconformities that CANNOT affect the data or the safety of personnel or that require an editorial change to the SOP.

Class A deficiencies must be resolved before that portion of the program can proceed. Class B deficiencies must have a determination as to whether they should be changed to Class A or C deficiencies and whether or not corrective action is necessary. If corrective action is necessary, it will be performed within a reasonable time frame agreed to by the program management and the Quality Assurance Department. Operations with Class A or B deficiencies are subject to re-audit to determine the effectiveness of corrective action. Class C deficiencies must have corrective action accomplished before the next scheduled audit or end of the project, whichever comes first.

Audit results are presented orally to the appropriate project or facility management by the audit team after the audit has been completed. At this time, specific findings are presented and recommended courses of corrective action developed. Subsequently, the audit results are documented in a written audit report and reviewed by management having responsibility in the areas audited. These reports include a summary of audit results, observations made with a listing of non-conformities, recommendations and corrective action taken.

The Quality Assurance Director maintains a file of all project and facility audits. This file includes copies of the audit checklists, audit reports, written replies, the record of completion of corrective action and follow-up action. Further copies of the audit reports, written responses and records of completion of corrective actions are sent to Normandeau's President. A summary report of audit results, and follow-up corrective action will also be made available for review by Entergy.

3.2 NON-CONFORMING ITEMS AND CORRECTIVE ACTION

Documentation of problems or unusual events occurring during a program are accomplished using Extraordinary Event/Nonconformity (EE/NC) Forms (Figure I-2). The EE/NC Form is designed to dispense information to the Program Manager and Quality Assurance Director and to obtain necessary action on items that are critical to technical operations and management of programs. The report results from observations such as:

- losing a sample
- finding a previously unreported species in a sample
- a lethal take of an Atlantic or shortnose sturgeon
- noting samples that are grossly different from expected (content, preservation, labels)
- noting a phenomenon that may deserve continued monitoring in the interest of the client and therefore may require a change in the scope of work, or
- a quality control samples that exceed acceptable limits.

The EE/NC Report is designed for use by any person who identifies a problem or discovers information that is germane to a program scope of work or the improvement or change of contract performance. The originator's supervisor is responsible for delivery of the completed form to the

appropriate action addressee. Action addressees must respond within the time frame indicated by the originator (normally ten working days) and address the report at the next scheduled monthly program review (if not required earlier by the action addressee's supervisor). The Quality Assurance Director is informed of each report and maintains an awareness of the status of follow-up on a weekly basis.

Items, samples, data, or information not in conformity with specifications or which do not meet preconditions for the next step in processing or use, are set aside until the problem is resolved and documented via the EE/NC Report procedure.

EXTRAORDINARY EVENT/NONCONFORMITY REPORT

EE/NC Report Number: Date:_____ From:_____

Respond by (date):_____ Project No.:_____ Title:_____

Date closed:_____

ADDRESSEES:

QA: ___ Project Mgr.:_____ Field Mgr.:_____ Lab Mgr.:_____ Technical Mgr.:_____ Others:_____

PROBLEM DEFINITION (e.g., Sample ID, Activity, Data, Standard, etc. Not in Conformity):

RECOMMENDATIONS FOR or CORRECTIVE ACTION TAKEN:

Signed:

ACTION ADDRESSEE RESPONSE:

CORRECTIVE ACTION COMPLETED: Date: _____ Signed: _____

Distribution: ORIGINAL: QA, COPIES OF ORIGINAL: Originator, Addressees
RESPONSES: QA (responses are to be made on copies)

Figure I-2. EE/NC Form.

II. FIELD STANDARD OPERATING PROCEDURES FOR THE HUDSON RIVER ICHTHYOPLANKTON SURVEY

1.0 SAMPLING SCHEDULE

Normandeau will collect Ichthyoplankton samples in the Hudson River during 23 river runs at randomly selected sites according to the following schedule:

2011 Week Beginning Monday	Ichthyoplankton River Run Number	Number of Samples Scheduled for Collection
14 March	1	98
21 March	2	98
28 March	3	98
4 April	4	193
11 April	5	193
18 April	6	193
25 April	7	199
2 May	8	199
9 May	9	199
16 May	10	192
23 May	11	192
30 May	12	192
6 June	13	208
13 June	14	208
20 June	15	208
27 June	16	208
11 July	17	92
25 July	18	92
8 August	19	92
22 August	20	92
5 September	21	92
19 September	22	92
3 October	23	92

Normandeau will collect ichthyoplankton samples in the Hudson River between RM 1 and 152 each week at randomly selected sites. River runs one through ten will be collected during daylight hours. Beginning with River Run 11 (23 May 2011) and continuing through the end of the survey with River Run 23 (week of 3 October 2011), all sample collections will be taken at night, defined as occurring between one-half hour after sunset and one-half hour before sunrise.

1.1 Randomly select sampling sites for each sample in each week within specified regions and strata using Con Edison's Random Site Generator Program.

1.2 Preserve regular all ichthyoplankton samples with 10% formalin and store them in heated storage until January 2012 unless they are picked up before that date by Entergy's designated Ichthyoplankton sample processing contractor.

1.3 Determine identification and number per length class of all yearling and adult fish collected in each sample. Release all yearling and adult fish in the field except specimens of questionable identification which are returned to the lab for ID verification.

1.4 Examine all striped bass and Atlantic tomcod for tags or finclips and record all pertinent data on the M1 data sheet for any tagged striped bass or Atlantic tomcod.

1.5 Process all Atlantic sturgeon and shortnose sturgeon in accordance with the governing scientific collector's permits issued by State (New York and New Jersey) and Federal (NOAA-NMFS) resource agencies.

1.6 With each epibenthic sled or Tucker trawl collection record: gear type, sample date, time, GPS location, river mile-site, tow duration, river and sample depth.

2.0 SAMPLING EQUIPMENT

2.1 SPECIFICATIONS

Samples will be collected using an epibenthic sled (Table II-1) and a Tucker trawl (Table II-2).

2.2 VESSEL SPECIFICATIONS

Hudson River Ichthyoplankton sampling will be conducted from Normandeau's 42 ft *Woody I.* The back-up vessels are Normandeau's 25-ft R/V *Privateer* and 37-ft R/V *Pannaway*.

Table II-1. Specifications of Epibenthic Sled

	GEAR CODE = 64
Net	
Length	8.0 m
Mouth (width)	1.0 m
Mesh size	500 µm (Ichthyoplankton Survey)
Net material	Nytex monofilament nylon
Collection Cup	
Length	30 cm
Length with net retaining ring	37 cm
Mesh size	500 µm (Ichthyoplankton Survey)
Net material	Nytex monofilament nylon

Table II-2. Specifications of Tucker Trawl

	GEAR CODE = 65
Net	
Length	8.0 m
Mouth (width)	1.0 m
Mesh size	500 µm (Ichthyoplankton Survey)
Net material	Nytex monofilament nylon
Collection Cup	
Length	30 cm
Length with net retaining ring	37 cm
Mesh size	500 µm (Ichthyoplankton Survey)
Net material	Nytex monofilament nylon

3.0 SAMPLE SITE SELECTION FOR THE HUDSON RIVER ICHTHYOPLANKTON SURVEY

3.1 Epibenthic sled and Tucker trawl sampling will be conducted in shoal and channel locations between RM 1 and RM 152. The Hudson River Ichthyoplankton Survey, region/strata allocations per river run are defined in Tables II-3 through II-8.

3.2 Within each river/strata allocation, sampling sites are determined using Con Edison's Random Site Generator Program.

3.2.1 River Mile (RM) is used throughout this document to describe mile long segments of the Hudson River measured along the centerline starting at mile point 0 which is the southern tip of Manhattan in Battery Park northward (upstream) to mile point 152 in Albany, NY. Therefore, RM 1 is the mile long segment of the river bounded by mile point 0 and mile point 1, RM 2 is the mile long segment of the river bounded by mile point 1 and mile point 2, and so forth.

3.3 The required input for this the random site generation program consists of four values:

a. The region number in which the sites are to be determined.
b. The river location (stratum) of the sites, either channel (greater than 20 ft deep) or shoals (5 to 20 ft deep).
c. The number of primary sites to be determined.
d. The number of alternate sites to be determined.

3.4 The Random Site Generator Program selects sample sites as follows:

a. Five digit random-numbers are generated and separated into two portions, three digits on the right and two to the left.

Table II-3. Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 1-3.

		SHOAL		CHANNEL		
Region	**River Mile**	**Sled**	**Trawl**	**Sled**	**Trawl**	**Total**
0	1-11	-	-	5	5	10
1	12-23	2	2	6	6	16
2	24-33	3	2	6	6	17
3	34-38	3	2	6	6	17
4	39-46	2	2	6	6	16
5	47-55	-	-	5	5	10
6	56-61	2	2	4	4	12
	TOTAL	12	10	38	38	98

Table II-4. Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 4-6.

		SHOAL		CHANNEL		
Region	**River Mile**	**Sled**	**Trawl**	**Sled**	**Trawl**	**Total**
0	1-11	-	-	8	6	14
1	12-23	2	2	7	5	16
2	24-33	6	4	4	4	18
3	34-38	4	3	4	4	15
4	39-46	2	2	4	4	12
5	47-55	-	-	5	5	10
6	56-61	3	2	3	3	11
7	62-76	-	-	3	3	6
8	77-85	-	-	3	7	10
9	86-93	-	-	8	6	14
10	94-106	-	-	8	6	14
11	107-124	-	-	16	7	23
12	125-152	-	-	20	10	30
	TOTAL	17	13	93	70	193

Table II-5. Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 7-9.

		SHOAL		CHANNEL		
Region	**River Mile**	**Sled**	**Trawl**	**Sled**	**Trawl**	**Total**
	1-11	-	-	6	6	12
1	12-23	2	2	7	5	16
2	24-33	6	4	4	4	18
3	34-38	4	3	4	4	15
4	39-46	2	2	6	10	20
5	47-55	-	-	6	15	21
6	56-61	3	2	8	5	18
7	62-76	-	-	10	10	20
8	77-85	-	-	9	11	20
9	86-93	-	-	6	7	13
10	94-106	-	-	3	5	8
11	107-124	-	-	3	5	8
12	125-152	-	-	5	5	10
	TOTAL	17	13	77	92	199

Table II-6. Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 10-12.

		SHOAL		CHANNEL		
Region	**River Mile**	**Sled**	**Trawl**	**Sled**	**Trawl**	**Total**
0	1-11	-	-	8	4	12
1	12-23	2	1	6	4	13
2	24-33	4	2	4	4	14
3	34-38	4	2	4	4	14
4	39-46	2	2	6	12	22
5	47-55	-	-	7	15	22
6	56-61	3	2	8	5	18
7	62-76	-	-	12	18	30
8	77-85	-	-	7	10	17
9	86-93	-	-	4	6	10
10	94-106	-	-	5	3	8
11	107-124	-	-	3	3	6
12	125-152	-	-	3	3	6
	TOTAL	15	9	77	91	192

Table II-7.	Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 13-16.					
		SHOAL		CHANNEL		
Region	River Mile	Sled	Trawl	Sled	Trawl	Total
0	1-11	-	-	6	4	10
1	12-23	2	2	6	7	17
2	24-33	2	2	5	5	14
3	34-38	3	2	6	6	17
4	39-46	3	2	5	16	26
5	47-55	-	-	8	24	32
6	56-61	2	2	12	12	28
7	62-76	-	-	7	15	22
8	77-85	-	-	5	9	14
9	86-93	-	-	4	6	10
10	94-106	-	-	4	2	6
11	107-124	-	-	3	3	6
12	125-152	-	-	3	3	6
	TOTAL	12	10	74	112	208

Table II-8.	Hudson River Ichthyoplankton Survey Sample Allocations for River Runs 17-23.					
		SHOAL		CHANNEL		
Region	River Mile	Sled	Trawl	Sled	Trawl	Total
0	1-11	-	-	6	6	12
1	12-23	2	2	6	4	14
2	24-33	3	3	4	4	14
3	34-38	3	3	4	4	14
4	39-46	3	3	4	4	14
5	47-55	-	-	4	4	8
6	56-61	2	2	3	3	10
7	62-76	-	-	3	3	6
	TOTAL	13	13	34	32	92

Note: Numerically coded boundaries for land, shoal, and channel have been manually created and stored for each region in which sampling sites are being allocated. Sampling sites are not placed in areas of cables, obstructions or bridges (Tucker trawls may be done over cables or pipelines). Tucker trawl sampling sites are not allocated in shoal areas where river depth is less than 10 ft.

b. Using the appropriate scale factors, the three digits to the right are converted to a vertical map coordinate and the two digits to the left to a horizontal map coordinate.

c. The resulting coordinate pair is tested against numerically coded values to determine if the site falls within the river boundaries, shoals or channel, and meets specified gear requirements.

d. If the randomly selected site does not satisfy the sample and gear requirements, the computer repeats its random selection program.

e. Each selected site which meets the sample and gear requirements for a specified region is stored. This process is repeated until the requested number of sites has been determined.

f. Stored values are then listed in the order of determination, sorted into descending sequence based upon the vertical coordinate, printed, and the numerically coded values for the region are printer-plotted with the selected sites indicated.

3.5 The Random Site Generator Program does not contain numerical descriptions of the Battery region (RM 1-11), the Yonkers region (RM 12-23) below river mile 14 and the Albany region above river mile 140. Lack of documentation presently precludes modification of the program to include these areas. A manual adaptation of the Random Site Generator Program is used to plot samples in the Battery, Yonkers and Albany regions. A description of this procedure follows:

Battery Region Channel Stations

a. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 0 and 321 inclusive to serve as the vertical coordinates.

b. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 0 and 41 inclusive (the maximum width of the channel in the Battery region to serve as horizontal coordinates.

c. Use the random numbers generated in 1 and 2 above to determine if the site falls within the river boundaries and the channel, and meets specified gear requirements.

d. If the randomly selected site does not satisfy the sample and gear requirements, discard that random number pair and test the next pair.

Yonkers Region Channel Stations

a. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 1 and 196 inclusive to serve as the vertical coordinates.

b. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 1 and 15 inclusive (the maximum width of the channel in the Yonkers region) to serve as horizontal coordinates.

c. Use the random numbers generated in 1 and 2 above in pairs to determine if the site falls within the river boundaries and the channel, and meets specified gear requirements.

d. If the randomly selected site does not satisfy the sample and gear requirements, discard that random number pair and test the next pair.

Yonkers Region Shoal Stations

a. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 1 and 196 inclusive to serve as the vertical coordinates.

b. Using a random number generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 1 and 6 inclusive (the maximum width of the west shoal in the Yonkers region) to serve as horizontal coordinates. The east shoal of the Yonkers region is narrow, steep, and unsampleable.

c. Use the random numbers generated in 1 and 2 above in pairs to determine if the site falls within the river boundaries and the shoal area, and meets specified gear requirements.

d. If the randomly selected site does not satisfy the sample and gear requirements, discard that random number pair and test the next pair.

Albany Region Channel Stations

a. Using a random generator, generate an appropriate number (usually 1.5 times the number of samples to be plotted) of random numbers between 1 and 425 inclusive to serve as the vertical coordinates.

b. Use the random numbers generated in 1 above to determine if the site falls within the river boundaries, and the channel and meets specified gear requirements.

c. If the randomly selected site does not satisfy the sample and gear requirements, discard that random number pair and test the next pair.

d. Random number pairs for epibenthic sled samples will be discarded if they fall in areas marked as "Cable Crossings" or "Obstructions" on navigation charts.

3.6 Sample sites are manually plotted on Hudson River chart transparencies (made for the U. S. Dept. of Commerce, National Oceanic and Atmospheric Administration, National Ocean Survey Charts) that contain river region designations as follows:

a. The appropriate scale factors are drawn on the vertical boundaries of each river region on the chart. The horizontal scale factor (same units as vertical scale factor) is taped to a T-square.

b. Tucker trawl depth factors are determined from a random number table as follows:

1. Select the last digit in the last column of numbers (do not use zeroes because zero river depth = zero). When the last digit within the last column of numbers is exhausted, proceed with the fourth digit in the last column of numbers, then the third, etc.
2. To calculate actual sampling depth, divide the random digit by 10 and multiply by the river depth of the randomly selected sampling site.
3. Disregard depth factors which would result in a Tucker trawl sample being taken less than 10 ft from the bottom when a channel sample is called for by the overall allocation of sampling effort. When the allocation calls for a Tucker trawl in the shoal stratum, do not place the sample in an area less than 10 ft deep.

c. Sample site allocations are read from the computer printout and plotted on photocopies of river chart transparency as follows:

1. Take the first site number on the printout, locate vertical mile and the graph coordinate (i.e., the three digits to the right factor). Adjacent to these figures on the printout is the horizontal mile and the graph coordinate (i.e., the two digits to the left factor). Alternate sites have negative site numbers.
2. For a given sample site allocation, locate the vertical graph coordinate on the transparency scale and place the T-square on the vertical coordinate (the T-square will set perpendicular to the vertical scale on the transparency). The horizontal graph coordinate is plotted from the scale located on the T-square. Plot this point on the river chart transparency with a waterproof marker. Follow this same procedure to plot sample site allocations for all given river regions within a sampling period (i.e., river run).

3. Sample site allocations are labeled as follows on photocopies of river chart transparencies:
   - Tucker trawl sampling sites are marked "T-a" (a = depth factor in tenths).
   - Epibenthic sled sampling sites are marked "S".
   - Alternate sampling sites are marked "A".
   - Sample sites selected from shoal areas are marked with a conspicuous "X" adjacent to the gear identification.
   - Sled in Shoal Stratum (5-20 ft river depth) = "SX"
   - Tucker Trawl in Shoal Stratum (10-20 ft river depth) = "T-X"
4. Sample allocations (number of samples per gear and strata) will be recorded for each river region on the river chart for review by the boat captain.
5. The Ichthyoplankton Task Leader will review the completed river chart before the charts are used in the field.

4.0 GEAR DEPLOYMENT AND COLLECTION METHODS

4.1 USE CODE AND SAMPLE NARRATIVE

4.1.1 All epibenthic sled and Tucker trawl samples are either Use Code 1, 2 or 5.

Use Code definitions are as follows:

USE CODE DEFINITIONS

USE CODES	DEFINITION
1	Assigned to samples when there are no sampling problems
2	Assigned to a sample when sampling problems are encountered and unusual species (Atlantic and shortnose sturgeon) are caught
5	Assigned to samples when sampling problems are encountered and no unusual species (Atlantic sturgeon, shortnose) are caught (i.e., void).

4.1.2 For use Code 2 samples process any adult Atlantic or shortnose sturgeon according to the procedures in Section 4.7. The ichthyoplankton portion (contents of sample jar) of the sample is not kept and the sample is retaken.

4.1.3 Any sample of seven or more containers, which is comprised of mostly detritus or debris, is assigned a Use Code 5. The contents of a Use Code 5 sample is not kept.

4.1.4 The Captain may retake a sample if he feels any other problems have prevented a valid sample.

4.1.5 Use Code 2 and 5 samples retain their original number and the next attempt receives the next successive number. An explanation for use code 2 and 5 is recorded under "comments" on the data sheet.

4.2 SAMPLE SITE LOCATION

4.2.1 Sample sites are located by landmarks, aids to navigation, vessel radar, soundings and Global Positioning Systems (GPS).

4.2.2 Alternate sites (within the same region and strata) are used if primary sites cannot be sampled.

4.2.3 The boat captain will keep a running total of samples taken in each river region and will not leave a river region until he has verified that the correct number of samples have been taken in each river region.

4.2.4 At the end of the sampling day, the boat captain will verify that the number of samples taken agrees with the sample allocations presented in Tables II-3 through II-8.

4.3 GEAR DEPLOYMENT

4.3.1 While the boat is moving forward against the current, a specified length of wire as determined by the wire angle chart (Table II-9) is released from the winch to set the gear at the prescribed depth.

- The wire angle is maintained at approximately 65 degrees from vertical for the sled and approximately 45 degrees for the Tucker trawl. Boat speed is adjusted to maintain proper wire angle. Wire angle is checked at least once per hour for Tucker trawl samples and recorded in the comments of the data sheet.

4.3.2 As soon as the gear is set, the messenger is released to open the net and the stopwatch is simultaneously started.

NOTE: In 20 ft or less of water the gear may be set and retrieved open. When either a sled or tucker trawl is deployed open, the stopwatch is started as soon as the gear is set at the prescribed sample depth and the stopwatch is stopped when the flowmeter clears the surface of the water.

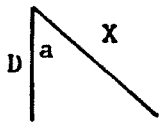
4.3.3 The epibenthic sled and Tucker trawl are towed at approximately 100 cm/sec (sled) and 90 cm/sec (Tucker trawl) based on engine RPM and GPS speed over ground.

4.3.4 The Tucker trawl cannot sample the water column any closer than 10 ft to the bottom for channel strata, and a minimum river depth of 10 ft is required for Tucker trawl deployment in the shoal strata. A minimum depth of 5 ft is required for epibenthic sled deployment in the shoal strata.

4.3.5 For the Tucker trawl, the numbers 1-9 prefixed by the letter "T" indicate the depth to be sampled at a particular sample site. For example, if the captain is on site and the river depth (fathometer reading) is 65 ft, the sample site allocation calls for a T-2. Therefore 0.2 x 65 ft = 13 ft, and the Captain lets out sufficient tow wire to set the bottom bar of the Tucker trawl at 13 ft for a T-2 in 65 ft of water. The wire angle chart is used to determine 6 meters of wire is required to deploy the Tucker trawl at a wire angle of 45 degrees and a sampling depth of 13 ft.

Table II-9. Depth of Wire in Feet Versus Wire Length in Meters and Wire Angle.

$\cos^a = \frac{D}{X}$



D = River depth
X = Wire length
A = Wire angle

Wire (Meters)	40°	45°	50°	55°	60°	65°	70°	75°
	Sample Depth (Feet)							
6	15	14	13	11	10	8	7	5
8	20	19	17	15	13	11	9	7
9	23	21	19	17	15	12	10	8
11	28	26	23	21	18	15	12	9
12	30	28	25	23	20	17	13	10
13	33	30	27	24	21	18	15	11
15	38	35	32	28	25	21	17	13
16	40	37	34	30	26	22	18	14
17	43	39	36	32	28	24	19	14
19	48	44	40	36	31	26	21	16
20	50	46	42	38	33	28	22	17
21	53	49	44	40	34	29	24	18
23	58	53	49	43	38	32	26	20
24	60	56	51	45	39	33	27	20
26	65	60	55	49	43	36	29	22
27	68	63	57	51	44	37	30	23
28	70	65	59	53	46	39	31	24
30	75	70	63	56	49	42	34	25
31	78	72	65	58	51	43	35	26
32	80	74	67	60	52	44	36	27
34	85	79	72	64	56	47	38	29
35	88	81	74	66	57	49	39	30
37	93	86	78	70	61	51	42	31
38	96	88	80	72	62	53	43	32
39	98	90	82	73	64	54	44	33
41	103	95	86	77	67	57	46	35
42	106	97	89	79	69	58	47	36

continued

Table II-9. (Continued)

Wire (Meters)	40°	45°	50°	55°	60°	65°	70°	75°
				Sample Depth (Feet)				
43	108	100	91	81	71	60	48	37
45	113	104	95	85	74	62	50	38
46	116	107	97	87	75	64	52	39
48	121	111	101	90	79	67	54	41
49	123	114	103	92	80	68	55	42
50	126	116	105	94	82	69	56	42
52	131	121	110	98	85	72	58	44
53	133	123	112	100	87	73	59	45
54	136	125	114	102	89	75	61	46
56	141	130	118	105	92	78	63	48
57	143	132	120	107	94	79	64	48
59	148	137	124	111	97	82	66	50
60	151	139	127	113	98	83	67	51
61	153	142	129	115	100	85	68	52
63	158	146	133	119	103	87	71	53
64	161	148	135	120	105	89	72	54
65	163	151	137	122	107	90	73	55
67	168	155	141	126	110	93	75	57
68	171	158	143	128	112	94	76	58
69	173	160	146	130	113	96	77	59
71	178	163	150	134	116	98	80	60
72	181	168	152	135	118	100	81	61
74	186	172	156	139	121	103	83	63

4.3.6 Digital flowmeters are rotated between both the sled and the Tucker trawl for each sample collected. Example: Three flowmeters number 1, 2, and 3.

Gear Sample-Site Allocation	Flowmeter Number
Sled	1
Sled	2
Tucker Trawl	3
Sled	1
Tucker Trawl	2
Tucker Trawl	3

4.3.7 All samples are of 5 min. duration unless consistently large numbers of fish are caught or if excessive clogging due to ctenophores is observed. In these events, 2 min. tows can be made with prior approval from Entergy.

4.3.8 A messenger is released to close the net, and simultaneously the stopwatch is stopped. For gear that is retrieved open, the stopwatch is stopped as the flowmeter comes out of the water.

4.3.9 The gear is retrieved and the net washed down from the outside with river water to concentrate the sample in the collection cup.

4.3.10 The flowmeter end reading is recorded and the flowmeter difference is calculated. The flowmeter difference for the sample is reported to the Captain after each calculation. If flowmeter difference meets the acceptable ranges in Section 4.3.11 than the tow is a Use Code 1 and the next sample is then collected.

4.3.11 A 90 to 100 cm/sec tow speed should yield the following ranges of flowmeter differences for a given tow duration:

Tow Duration in Minutes	Hudson River Ichthyoplankton Survey Tow Duration Acceptable Ranges of Flow Meter Difference*
1	713 - 3,800
2	1,426 - 7,603
3	2,140 - 11,404
4	2,853 - 15,206
5	3,566 - 19,007
6	4,279 - 22,808
7	4,992 - 26,610
8	N/A

*Difference = final reading - start reading

4.4 FIELD PROCESSING OF SAMPLES

4.4.1 All Use Code 1 samples are processed in the following manner:

4.4.1.1 The lower 4 feet of the net are washed down from the outside with a high pressure deck hose to concentrate the sample in the collection cup.

4.4.1.2 The contents of the collection cup are transferred into a sieve of equal or finer mesh size to remove excess water. The collection cup is rinsed from the outside, with river water, to remove any residual sample.

4.4.1.3 Identify all sturgeon using the external features listed in Section 4.6.

4.4.1.4 All Atlantic and shortnose sturgeon present in the catch are handled with care and, if possible, returned to the river alive after being identified, closely examined for external and internal tags, measured to the nearest millimeter and weighed to the nearest gram. Atlantic and shortnose sturgeon that have not been tagged are released following the procedures listed in Section 4.7. Record all pertinent sturgeon data on the M1 card type.

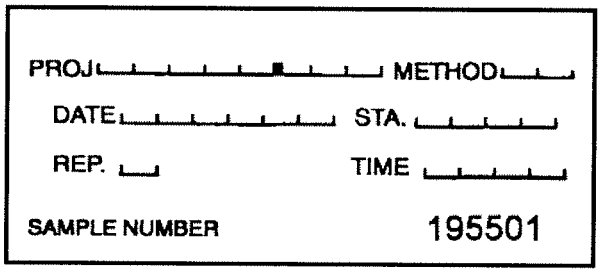
4.4.1.5 Any Atlantic or shortnose sturgeon that are dead at capture are transported to the laboratory, frozen and saved for the New York State Department of Environmental Conservation. Notify the National Marine Fisheries Service as required in Permit to Take Protected Species For Scientific Purposes Permit No. 1580 (Section VIII). An EE/NC form is completed as per the procedures in Section 3.2.

4.4.1.6 All yearling and adult fish are identified and counted by the following four length classes (total length):

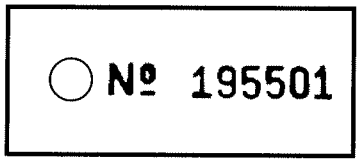
- Length Class 1 - less than or equal to the young-of-the-year length limit ("Division 1").
- Length Class 2 - greater than Division 1 and less than or equal to the yearling length limit ("Division 2").
- Length Class 3 - greater than Division 3 and less than or equal to 250 mm.
- Length Class 4 - greater than 250 mm.

4.4.1.7 Fish of all remaining species are returned to the water, alive if possible, after being identified, sorted by length class, counted and recorded on the field data sheet.

4.4.1.8 The remaining sample is placed in a container and filled completely to the top with 10% formalin. The container is labeled externally with a printed label and an internal label containing sample number is placed inside the sample jar (see examples of external and internal labels for sample number 195501 shown below).



External Label



Internal Label

4.4.1.9 Use Code 5 Samples Do Not Require Field or Lab Processing

4.4.1.10 The sample number and tow direction are recorded on the Hudson River site allocation chart.

4.4.1.11 Upon return to the lab, samples are taken to the sample storage area, and the number of sample jars per sample are verified against the field data sheet.

4.4.1.12 At the end of each night of sampling, a captain's report will be completed and forwarded to the Program Manager/Field Operations Manager.

4.5 SPECIES REQUIRING SPECIAL HANDLING

Shortnose sturgeon (*Acipenser brevirostrum)* and Atlantic sturgeon (*Acipenser oxyrhynchus*) are two fish species requiring special handling during the Ichthyoplankton and Fall Juvenile Surveys. Shortnose sturgeon is a federally listed endangered species and subjected to protection under the Endangered Species Act and State (NY and NJ) scientific Collectors Permits (see Section VI and VII). All of the Hudson River field sampling activities with respect to the capture and handling of shortnose sturgeon are governed by the provisions of "Permit To Take Protected Species For Scientific Purposes" Permit No. 1580 that is administered by the National Marine Fisheries Service (see Section VIII of this SOP for a copy of Permit No. 1580), which expires on 31 March 2012. The New York Department of Environmental Conservation has also expressed an interest in the management of both shortnose and Atlantic sturgeon found within the Hudson River estuary, New York Harbor, and adjacent waters, and specimens of both species have been marked and released with a variety of tags including Passive Integrated Transponder (PIT) tags and Carlin-Ritchie tags. All sturgeon caught will be examined for the presence of these tags and other marks. Therefore, both shortnose and Atlantic sturgeon are considered species requiring special handling during the Hudson River Ichthyoplankton survey.

4.6 TAXONOMY

Three different external features will be used to distinguish shortnose and Atlantic sturgeon in the field:

1. the mouth width to eye distance ratio,
2. the presence or absence of bony plates (scutes) found between the base of the anal fin and the midlateral line, and
3. the presence of one or two rows of scutes found along the dorsal midline posterior to the dorsal fin, and along the ventral midline anterior to the anal fin.

To identify the correct sturgeon species, first the ratio of the mouth width to the distance between the eyes is calculated. A shortnose sturgeon has a relatively large mouth compared to an Atlantic sturgeon (see Figure II-1). Shortnose sturgeon are reported to exhibit a mouth width to eye distance ratio of greater than 62% (typically 63% to 81%, Musick in Collette and Klein-MacPhee, 2002). An Atlantic sturgeon has a smaller mouth and exhibits a mouth width to eye distance ratio of less than 62% (typically 43% to 66%, Musick in Collette and Klein-MacPhee, 2002). The mouth width in mm is measured with calipers inside of the lips. The distance between the eyes in mm is also measured with calipers. The ratio of the mouth width to the distance between the eyes is calculated by taking the measured mouth width and dividing it by the eye width and multiplying by 100 to express the number as a percentage. For example, if the measured mouth width is 47 mm and the measured eye

width is 64 mm, then ratio is 47/64 = 0.734 * 100 = 73.4%, and this fish is likely to be a shortnose sturgeon.

Because there is some overlap between the range of mouth widths to eye width ratios reported for some Atlantic sturgeon (62% to 66% for both species, Musick in Collette and Klein-MacPhee, 2002), a second characteristic must also be used to distinguish the two sturgeon species. The presence or absence of bony plates (scutes) above the anal fin will also be used to distinguish shortnose and Atlantic sturgeon. If two to six scutes at least as large as the pupil of the eye are found above the anal fin in the space between the base of the anal fin and the midlateral row of scutes (see Figure II-1), then the sturgeon is an Atlantic sturgeon. If no scutes are found between the base of the anal fin and the midlateral row of scutes, the sturgeon is a shortnose sturgeon.

A third characteristic can also be used to verify the sturgeon species identification based on the mouth to eye ratio and the presence or absence of anal fin scutes. This is the presence of a single or double row of scutes in the post-dorsal or pre-anal portions of the body (Smith 1985). Looking at the dorsal (top) surface of the fish, an Atlantic sturgeon will have two rows of scutes between the posterior edge of the dorsal fin and the anterior edge of the caudal fin, one row on either side of the mid-dorsal line. Turning the fish over and looking at the ventral (belly) area between the anterior edge of the anal fin and the pelvic fins, an Atlantic sturgeon will also have two rows of scutes, one row on either side of the mid-ventral line. If the fish is a shortnose sturgeon, it will have a single row of scutes in both the post-dorsal and pre-anal areas, with this row aligned directly down the mid-line. In some shortnose sturgeon, particularly on smaller specimens, the post-dorsal row of scutes may be almost completely absent. A comparison of these distinguishing features is shown in the following table:

Species	Mouth/Eye Ratio	Anal Fin Lateral Scutes	Post-Dorsal Scutes	Pre-Anal Scutes
Atlantic Sturgeon TAXON = 29	<62%	2 to 6 bony plates present	Double row	Double row
Shortnose Sturgeon TAXON = 27	>62%	Absent	Single row or absent	Single row

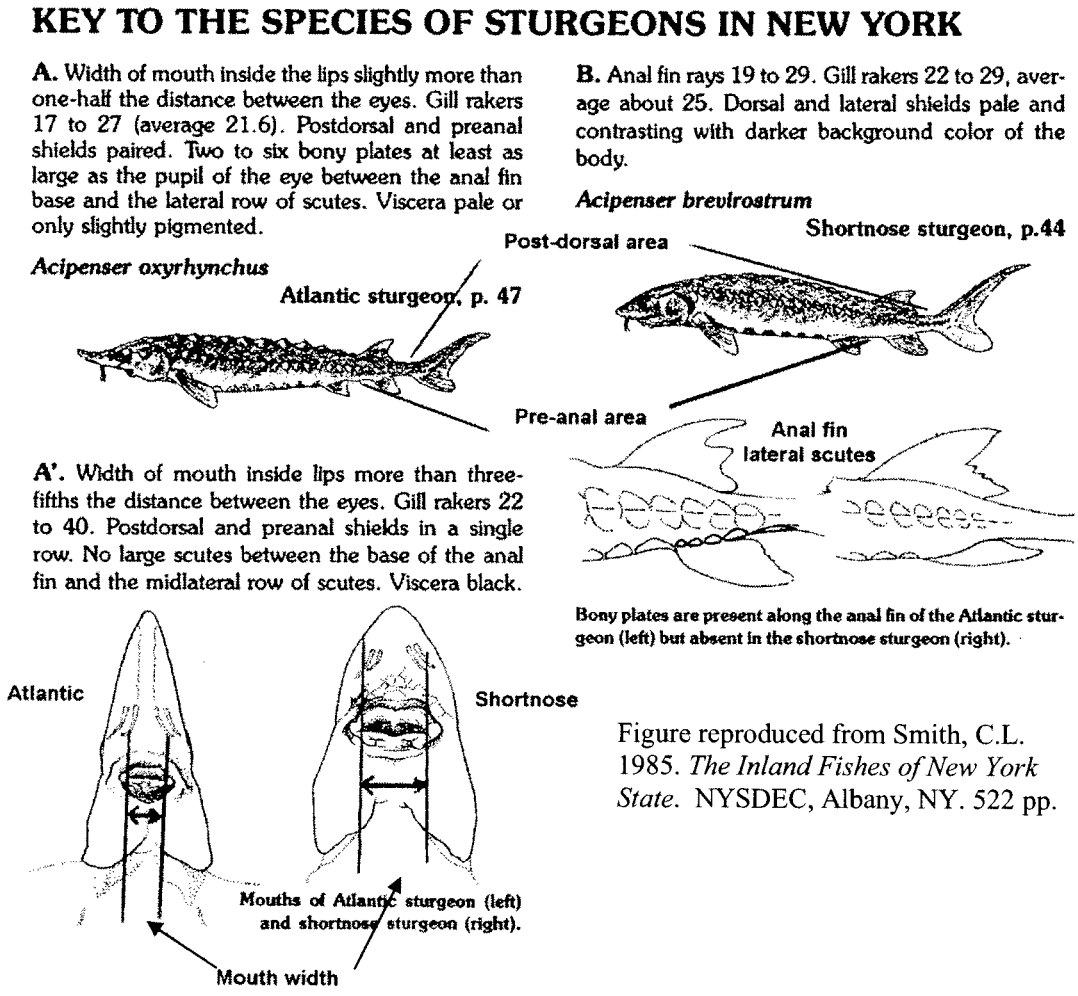


Figure reproduced from Smith, C.L. 1985. *The Inland Fishes of New York State*. NYSDEC, Albany, NY. 522 pp.

Figure II-1. Distinguishing taxonomic features of Hudson River Atlantic sturgeon and shortnose sturgeon (from Smith 1985).

4.7 ATLANTIC AND SHORTNOSE STURGEON PROCESSING PROCEDURES

4.7.1 Every effort should be taken to release shortnose sturgeon alive according to the conditions of the "Permit To Take Protected Species For Scientific Purposes" Permit No. 1580 (see Section VIII of this SOP). If, in this judgment of the principal investigator or co-investigator, complete processing of Atlantic or shortnose sturgeon is likely to endanger the survival of the fish, the minimum processing of identification to species will be performed and the fish will be released with a comment made on the data sheet describing the reasons why full processing was not completed.

4.7.2 Taxonomic features used to distinguish shortnose and Atlantic sturgeon will be documented on the M1 Card Type (Section 5.2.5 of this SOP) under the variables EYE WIDTH, MOUTH WIDTH, MOUTH/EYE RATIO, LATERAL ANAL SCUTES, POST-DORSAL SCUTES, and PRE-ANAL SCUTES. Check the data recorded for these variables recorded against the table in Section 4.6 to be sure that all values agree with the assigned taxon code.

4.7.3 Check all Atlantic sturgeon and shortnose sturgeon for external and internal tags and record all pertinent data on the M1 data sheet.

4.7.4 Scan the sturgeon for a passive integrated transponding (PIT) tag that may lie anywhere under the first 7 or 8 dorsal scutes and an external Carlin-Ritchie disc dangler tag inserted through the dorsal fin. If a recaptured sturgeon is found with a tag present, record the tag number or numbers on the M1 data sheet and continue with the next step.

4.7.5 Length (mm total length), weight (grams), condition at time of capture (alive or dead), and sex if readily apparent, are determined and recorded on the M1 Card Type for each sturgeon caught.

4.7.6 Obvious abnormalities (e.g., fin rot) are noted in the comments section of the field data sheet.

4.7.7 Each sturgeon caught will be examined for the presence of external tags or marks, and scanned with a hand-held PIT tag reader to determine the presence of internal PIT tags. Each sturgeon caught with a tag present will be assigned a REL_REC = 2 and have the tag number or description of the mark recorded on the M1 Card Type. A comment will also be written to describe the condition of the tag insertion site will be made for each recaptured sturgeon caught.

4.7.8 Each sturgeon 250 mm or smaller and each sturgeon recaptured with one or more tags present will have three photographs taken. The purpose of taking photographs of the smaller sturgeon is because there may be more variability in small fish in the taxonomic characteristics recorded for each species, and the photographs will be used to document this variability. Recaptured fish will be photographed because of their importance to the management program. The three photographs (digital images) taken for each sturgeon will include:

4.7.9 A close up of the eyes with mm ruler for scale,

4.7.10 A close up of the mouth with mm ruler for scale, and

4.7.11 A close up side view of base of anal fin to reveal presence or absence of anal scutes.

4.7.12 TASK_CD, SAMPLE, FISH_ID, TAXON, DATE, TIME, RM and SITE will be written on a paper label and included within the field of view of each photograph taken.

4.7.13 If the Atlantic or shortnose sturgeon (larger than 250mm) has not been previously tagged process as follows. Sturgeon smaller than 250mm are not tagged. Use a large holding container with

a flow through water supply to keep the sturgeon in, between the many long steps. Handling time on sturgeon must not exceed 15 minutes.

4.7.14 Put a Carlin-Ritchie disc dangler tag in the fleshy part of the dorsal fin (Figure II-2). Insert two needles through the fleshy area and sticking the wire ends of the Carlin-Ritchie disc dangler tag through the needles, thus pulling the needles out along with the wire ends back through. Twist the wire ends together, cutting the excess part off, and then bend the twist part back so that it does not rub on the sturgeon.

4.7.15 Insert a PIT tag with the big hypodermic needle under the 3rd or 4th dorsal scute by first puncturing in a fleshy area and then positioning the needle to push up underneath the scute (Figure II-2). Scan the sturgeon with the PIT tag detector and record the number of the 10 digit PIT tag and the 5 digit Carlin-Ritchie disc tag on the M1 data sheet.

4.8 TAKING GENETIC ANALYSIS SAMPLES

4.8 Before a tagged Atlantic or shortnose sturgeon is released a tissue sample for Genetic Analysis will be collected following the protocol described in Figure II-3. Previously tagged Atlantic or shortnose sturgeon will not have a genetic sample taken.

4.8.1 For genetic samples cross contamination must be avoided. For each fish sampled use a new pair of latex gloves and scalpel blade for cutting and handling the sample. If contamination occurs DISCARD the sample.

4.8.2 Place a 1 cm^2 clip of pelvic fin section in a vial with the preservative (95-100% ethanol). Be sure to use ethanol that has not been denatured with methanol or other chemical additions.

4.8.3 Label fish tissue vial using a waterproof pen (Sharpie) with sample number and fish ID number. Then place properly closed vial in a small Ziploc bag labeled with an Internal and External label. See Section 4.4.1.8 for example of labels.

4.8.4 Place Ziploc bag containing tissue sample vial in a cooler on ice. Upon returning to the laboratory the tissue samples are to be kept refrigerated until shipped to NOS as specified in Figure II-3.

4.8.5 Record on the M1 data sheet (Figure II-6) that a tissue sample was taken.

4.8.6 Complete a "Certification of species Identification" form (Figure II-4). This form states that the sampler personally identified the sturgeon from which the sample was taken. **If there is any doubt about the identification of a sturgeon , then do not take a tissue sample for Genetic Analysis.**

4.8.7 Make sure you let the sturgeon recover in the holding container before releasing.

4.8.8 Gently release the sturgeon when sufficiently recovered.

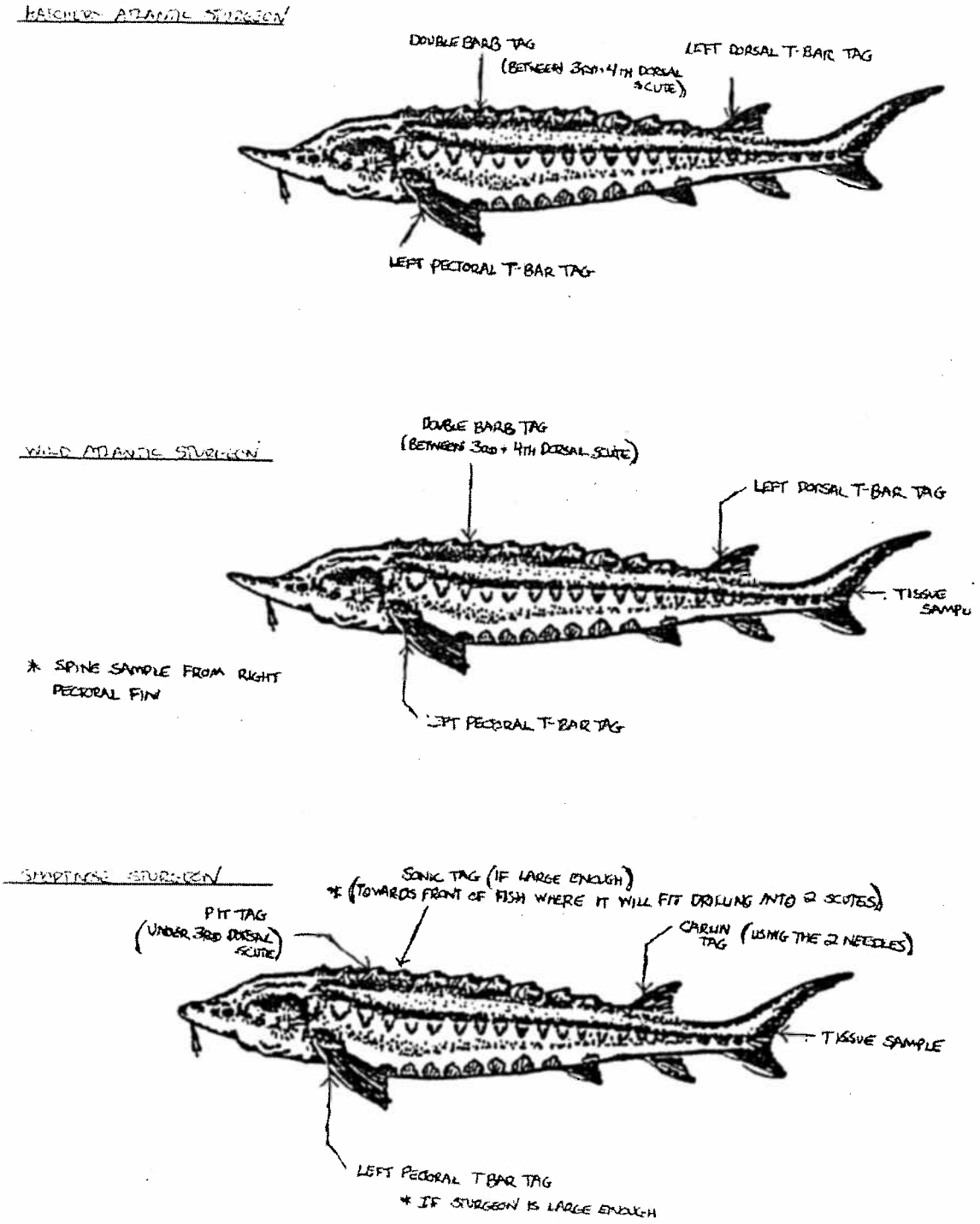


Figure II-2. Tag placement on Atlantic and Shortnose sturgeon.

PROTOCOL FOR COLLECTION OF TISSUES FOR GENETIC ANALYSIS

1. For each fish, assign a fish number to be used for identification of all samples from this individual. This number will be placed on each vial and will be used to reference collection data. As fish are sampled, please provide requested information on supplied form (size, weight, sex, location, etc.).

2. **Tissue Sampling Instructions**

   a. Cleanliness of Samples. For genetic samples **cross contamination must be avoided**. For each fish, use a new or cleaned knife/razor blade for cutting and handling samples. (Contamination might occur if a cutting tool is used on different animals without cleaning or if a sample contacted blood or tissue from another animal.) If contamination occurs DISCARD the sample.

   b. Barbel and/or Fin clip Sampling.

   i. **Label vial with fish number.**
   ii. **Place either a 2-3 cm section of barbel or a 2-3 cm fin clip in vial with preservative (lysis buffer).**
   iii. **Place vials in box provided.**

4. **Species Identification Statement.** For all samples, please provide a "Certification of Species Identification" (form provided by NOS). This form states that the sampler personally identified the animal from which the sample was taken. ***If there is any doubt about the identification of a sample, then do not include that sample.***

5. **Chain of Custody.** We are also requesting that a "Chain of Custody" be maintained on all samples. These samples will become part of the Marine Forensics archive and as such be maintained as standard material. In order to maintain the chain of custody, the collector should initiate this form. The chain of custody accompanies the sample at all times. The sample and the form must be packaged together to ensure that no tampering has occurred. (For instance, the box of samples and all the chain of custody forms may be sealed in a single plastic bag.)

6. **Shipping Instructions.** Place box of samples and documentation in shipping box provided. ***To maintain the chain of custody, the collector should seal the box.*** Affix the pre-addressed FEDEX label to the samples and ship.

7. Contacts

a. Shipping, Supplies and Questions

Julie Carter, Archivist
National Ocean Service
Charleston Laboratory
219 Ft. Johnson Rd.
Charleston, South Carolina 29412
USA

Telephone: (voice) 843 762 8811 or 843 762 8500
Fax: 843 762-8700
Email: julie.carter@NOAA.gov

Figure II-3. Protocol for collection of tissues for genetic analysis.

CERTIFICATION SPECIES IDENTIFICATION OF STANDARD

I _____ hereby certify that I have positively identified
Full Name
the whole animal as _____, based on my knowledge
Scientific Name
and experience as a _____.
Position or Job Title

Signature: _____ Date Identified: _____
Address: _____

_____

Phone Number: _____

****

THE ABOVE EVIDENCE WAS TRANFERRED AS FOLLOWS:

1. _____ _____ _____
Release Signature Method of Transfer Date

_____ _____
Receipt Signature Date

2. _____ _____ _____
Release Signature Method of Transfer Date

_____ _____
Receipt Signature Date

3. _____ _____ _____
Release Signature Method of Transfer Date

_____ _____
Receipt Signature Date

4. _____ _____ _____
Release Signature Method of Transfer Date

_____ _____
Receipt Signature Date

5. _____ _____ _____
Release Signature Method of Transfer Date

_____ _____
Receipt Signature Date

Figure II-4. Certification Species Identification of Standard.

5.0 DATA HANDLING - FIELD DATA SHEET

All completed data sheets are reviewed for completeness and legibility by the originator. Data sheets are then transferred to the Field Operations Manager for quality control checks.

5.1 FIELD DATA SHEET

The field data sheet consists of four card types incorporated onto an 8-1/2" x 11" sheet of weatherproof paper (Figure II-5). Data from sample processing that occurs in the field for all field tasks is recorded on a data sheet of this type. Specific coding instructions for each of the four card types included on this data sheet appear on the following pages. Data requirements are task specific (i.e., entries are not made for all variables for every task) and are outlined below. Data sheets are made task-specific by blocking out the box(es) of those variables not required for that task.

The following card types are used for the Hudson River Ichthyoplankton Survey:

CARD TYPE	DESCRIPTION
S1	Field Header Information
Q1	Water Quality Data
R1	Number of samples returned to laboratory
C1	Counts of species by length class

A second datasheet (Figure II-6) is the M1 card type, which is used to record data for each Atlantic or shortnose sturgeon caught. All limiting values, tolerances, and precision limits are described or referenced in the preceding sections. All codes and variables are described in detail in the Con Edison Data Dictionary. The term "enter" appears in the data sheet coding instructions for all variables which require review of the data dictionary for appropriate codes. The term "record" indicates no further information is required in order to complete the coding. The abbreviation N/A means the variable is not applicable to this study and is not entered or recorded.

5.2 CODING INSTRUCTIONS FOR FIELD DATA SHEET

Coding instructions for each card type are given below. Definitions for each variable and corresponding codes for each variable can be found in the Con Edison Data Dictionary. All entries should be made neatly with only one symbol per data block. The individual whose initials are entered on the data sheet is responsible for assuring the legibility of all entries.

5.2.1 Coding for Header Information

VARIABLE NAME	INSTRUCTIONS
TASK_CD	88 Hudson River Ichthyoplankton Survey
SAMPLE	Pre-numbered
GEAR	Enter 64 for Epibenthic Sled
	Enter 65 for Tucker trawl
YEAR	Record year

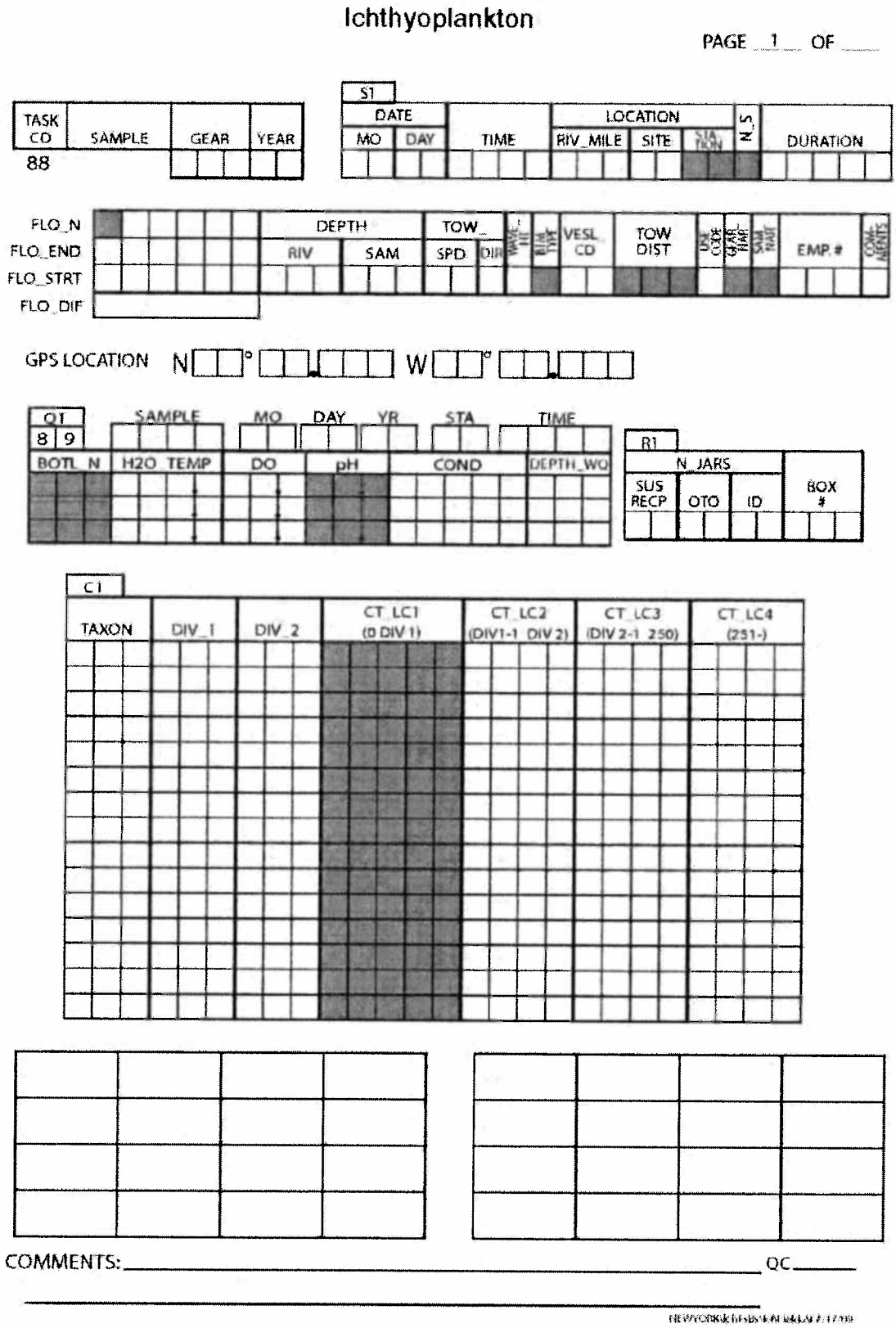


Figure II-5. Field Data Sheet for Hudson River Ichthyoplankton Survey.

5.2.2 Source Card Type S1

Source card type S1 is used to record field sampling information.

NOTE: N/A = not applicable, therefore not recorded.

VARIABLE NAME	INSTRUCTIONS
SOURCE CARD TYPE	Preprinted S1
DATE	Record date (Mo/Day) of sample collection
TIME	Record time of the collection using 24-hour clock
LOCATION:	
RIV_MILE	Record river mile in which sample was collected
SITE	Enter appropriate code for site of collection: 4 = west shoal (depth 20 feet) 5 = channel (depth > 20 feet) 6 = east shoal (depth 20 feet)
STATION	N/A
N_S	N/A
DURATION	Record the duration of the sampling effort in minutes to the nearest tenth
FLO_N	Record the flowmeter number
FLO_END	Record flowmeter reading at completion of sample collection
FLO_START	Record flowmeter reading at start of sample collection
FLO_DIF	Calculate difference between flowmeter start and end readings to determine if sample is valid
DEPTH_	
SAM	Record sampling depth in feet
RIV	Record river depth in feet
TOW_	
SPD	Record tow speed in meters per second
DIR	Enter tow direction code: 1 = north 2 = south 3 = east 4 = west

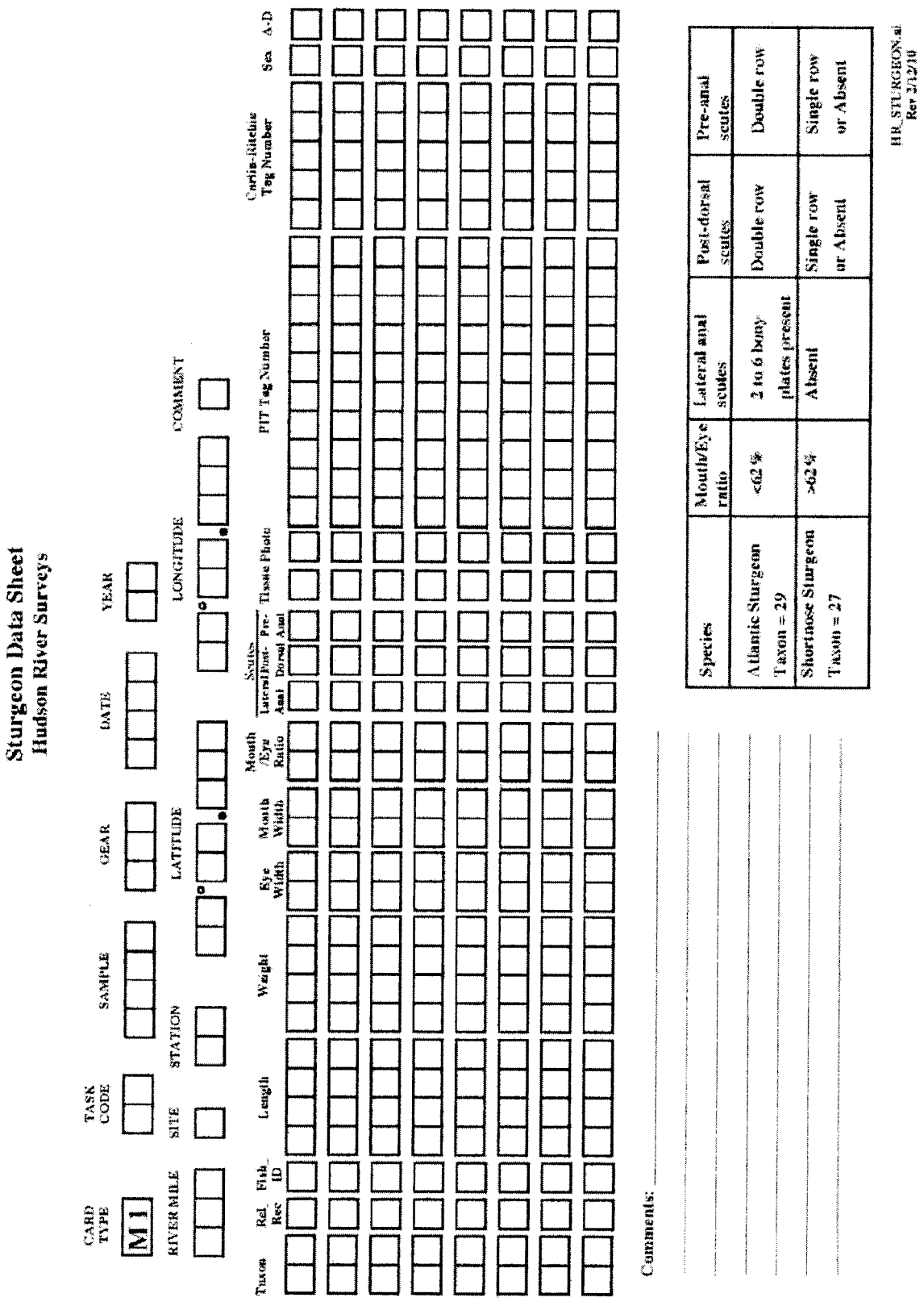


Figure II-6. Hudson River Ichthyoplankton Survey Sturgeon Datasheet.

WAVE_HT	Enter code for estimated wave height: 1 = calm to 1/2 ft 2 = light chop (>1/2 ft to 1 ft) 3 = heavy chop (>1 ft to 2 ft) 4 = large waves (>2 ft)
VESL_CD	Enter appropriate code for sampling vessel *Woody I* = 9 *Pannaway* = 15 *Privateer* = 26
USE_CODE	Enter appropriate use code: 1 = no sampling problems 2 = sampling problems and unusual species are caught 5 = sampling problems, i.e. void
GEAR_NAR	N/A
SAM_NAR	N/A
EMP. #	Record employee number of individual responsible for sample collection
GPS POSITION	Record the GPS position of the vessel at the start of the tow (Lat. and Lon.).
COMMENTS	Record any pertinent information not recorded else-where on back of sheet. Check comments block if comments may affect data interpretation.
ENG_RPM	N/A

5.2.3 Source Card Type R1

Source card type R1 is used to record the type and number of jars which contain biological sample(s).

VARIABLE NAME	INSTRUCTIONS
SOURCE CARD TYPE	Preprinted R1
NO. OF JARS	Record number of jars containing fish which are
SUS_RECP	Suspected recaptures
OTO	Record number of jars containing fish for special aging sample
ID	Record number of jars containing fish for identification and enumeration
BOX #	Record box number for sample storage and inventory

5.2.4 Source Card Type C1

Source card type C1 is used to record total catch per length class data for fish processed in the field. All yearling and adult fish caught in each sample will be enumerated into one of four length classes.

NOTE: N/A = Not applicable to present task, therefore not recorded.

VARIABLE NAME	INSTRUCTIONS
SOURCE CARD TYPE	Preprinted C1
TAXON	Enter appropriate taxon code

DIV_1	Record appropriate Div 1 length limit for that taxon code and date (see current upper length limit sheet for Div 1)
DIV_2	Record appropriate Div 2 length limit for that taxon code and date (see current upper length limit sheet for Div 2)
CT_LC1	Record the total count of fish (by taxon) with lengths from 0 mm through Div 1
CT_LC2	Record the total count of fish (by taxon) with lengths from Div 1+1 mm through Div 2
CT_LC3	Record the total count of fish (by taxon) with lengths from Div 2+1 mm through 250 mm
CT_LC4	Record the total count of fish (by taxon) with lengths greater than 250 mm (251 mm +)

COMMENTS Record any pertinent information not recorded elsewhere (only check box if comments may affect data interpretation.)

5.2.5 Source Card Type M1

Source card type M1 is used to record all pertinent information associated with the recapture of Atlantic tomcod, striped bass and for each Atlantic sturgeon or shortnose sturgeon caught. There is one record for each fish caught.

VARIABLE NAME	INSTRUCTIONS
TASK CODE:	Enter 88=Ichthyoplankton Survey
SAMPLE:	Record sample number.
GEAR:	Enter collection Gear 64=Epibenthic Sled
DATE:	Record date (Mo/Day) of sample collection.
YEAR:	Record year.
RIVER MILE AND SITE:	Record river mile and site of collection.
STATION	Blank = not recorded for Ichthyoplankton Survey
LATITUDE:	Record the GPS position at the start of the tow.
LONGITUDE:	Record the GPS position at the start of the tow.
TAXON:	Enter 27 = shortnose sturgeon 29 = Atlantic sturgeon 30 = striped bass 32 = Atlantic tomcod
REL_REC:	Enter 1 = Release 2 = Recapture 3 = Returned to Laboratory
LENGTH:	Record total length of sturgeon, striped bass or Atlantic tomcod.

VARIABLE NAME	INSTRUCTIONS
WEIGHT:	Record weight in grams of Atlantic or shortnose sturgeon.
EYE WIDTH:	Measure and record eye width of Atlantic or shortnose sturgeon.
MOUTH/EYE RATIO:	Record the mouth width divided by the eye width to the nearest whole percentage (e.g. 45% or 73%).
LATERAL ANAL SCUTES:	Enter a code for the presence or absence of scutes (bony plates at least as large as the pupil of the eye) found between the base of the anal fin and the midlateral row of scutes (refer to Figure II-1). 1 = no scutes found just above base of the anal fin 2 = two to six scutes found just above the base of the anal fin.
POST-DORSAL SCUTES:	Enter a code for the presence or absence of scutes (bony plates at least as large as the pupil of the eye) found along the dorsal surface between the base of the dorsal fin and the caudal (tail) fin (refer to Figure II-1). 1 = one row of scutes found along the dorsal mid-line, or absent 2 = two rows of scutes, one on either side of the dorsal mid-line.
PRE-ANAL SCUTES:	Enter a code for the presence or absence of scutes (bony plates at least as large as the pupil of the eye) found along the ventral surface between the base of the anal fin and the pectoral fins (refer to Figure II-3). 1 = one row of scutes found along the ventral mid-line 2 = two rows of scutes, one on either side of the ventral mid-line.
TISSUE:	Blank = no sample taken 1 = tissue sample taken.
PHOTO:	Enter a code specifying if one or more digital photographs were taken of the sturgeon caught (see Section 4.7 of this SOP for details). Blank = no photos taken 1 = photos taken.
MOUTH WIDTH:	Measure and record mouth width of Atlantic or shortnose sturgeon.
PIT TAG NUMBER:	Record 10 digit Pit Tag number.
CARLIN-RITCHIE	Record 5 digit Carlin Ritchie tag number.
SEX:	Enter 1= male 2=female
A-D:	Enter 1=alive 2=dead
COMMENT:	1 = record any pertinent information that may affect data interpretation.

5.3 CAPTAIN'S REPORT

At the end of each night of sampling a captain's report (Figure II-7) will be completed and forwarded to the Program Manager/Field Operations Manager.

5.3.1 Instructions for completing the captain's report are as follows:

VARIABLE NAME:	INSTRUCTIONS
RIVER RUN:	Record river run number collected
BOAT:	Record name of vessel samples collected with
CAPTAIN:	Record captain's name
DATA RECORDER:	Record data recorder name
DECK PERSON:	Record name of person processing samples
DATE:	Record date that sampling occurred
RANGE OF RIVER SAMPLED:	Record start and end river miles
SAMPLING TIMES:	Record start and end sampling times
SAMPLING NUMBERS:	Enter sample numbers used for that sampling day
SAMPLING PROBLEMS:	None- if no problems check "None"
	Check appropriate boxes for listed items whether "malfunctioning or broken (repairable)/ Lost or destroyed (non-repairable)"
OTHER PROBLEMS:	Specify; including personnel problems, sampling difficulty and anything else that may affect sampling
CAPTAIN's REQUESTS:	List anything that you need done, bought, etc., that is necessary to sampling
FISH DISTRIBUTION:	For striped bass, Atlantic tomcod, American shad and Clupeids
	Eggs- Check appropriate blank for Present or Absent
	Range of River Present- enter river mile range
	Range of Maximum Concentration- enter range of maximum concentration within "Range of River Present"
	Larvae- Check appropriate blank for Present or Absent
	Larvae Life Stage- Check appropriate blank for yolk-sac or post yolk-sac
	Range of River Present- enter river mile range
	Range of Maximum Concentration- enter range of maximum concentration within "Range of River Present"
UNUSUAL SPECIES (LIST):	Enter names, amount and river mile

CAPTAIN'S DAILY REPORT
Atlantic Tomcod and Longitudinal River Surveys
(Fax to Project Manager at end of each sampling day)

River Run: _____ Date: _____

Boat: _____ Range of River Sampled RM _____ to RM _____

Captain: _____ Sampling Times: Start _____ End _____

Data Person: _____ Sampling Numbers: Start _____ End _____

Deck Person: _____

Sampling Problems: _____

None _____

	Malfunctioning or Broken (Repairable Gear)	*Lost or Destroyed (Non-Repairable Gear)*
Epibenthic Sled/Tucker Trawl		
Electronic Flowmeter		
Flowmeter Readout		
Digital Flowmeter		
Boat		
Motor		
Trailer		

Other problems: _____

Captain's requests: _____

_____

FISH DISTRIBUTION

STRIPED BASS

Eggs: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____
Larvae Life Stage: Yolk-sac _____ Post Yolk-sac _____
Larvae: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____

SHAD

Eggs: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____
Larvae Life Stage: Yolk-sac _____ Post Yolk-sac _____
Larvae: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____

ATLANTIC TOMCOD

Eggs: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____
Larvae Life Stage: Yolk-sac _____ Post Yolk-sac _____
Larvae: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____

CLUPEIDS

Eggs: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____
Larvae Life Stage: Yolk-sac _____ Post Yolk-sac _____
Larvae: Present _____ Absent _____
Range of river present: RM _____ to RM _____
Range of Maximum Concentration: RM _____ to RM _____

Unusual species (list): _____

TcCaptReport.ai 2/07/05

Figure II-7. Captain's report.

6.0 WATER QUALITY MEASUREMENT

6.1 EQUIPMENT

Water quality measurements will be made with a Yellow Springs Instruments (YSI) model 57 dissolved oxygen meter YSI model 33 salinity-conductivity-temperature meter, the YSI Model 85 or the YSI Professional Plus water quality systems.

6.2 CALIBRATION

The YSI meters will be calibrated prior to each day's sampling and checked for accuracy once during each sampling season (instrument calibration procedures are described under Section 9.0, Equipment Calibration and Maintenance). YSI Model 85 water quality systems will be calibrated and checked as described in the YSI Model 85 operations manual in Appendix 1. The YSI Professional Plus water quality system will be calibrated and checked as described in the YSI Professional plus user manual in Appendix 2.

6.3 FIELD PROCEDURES

6.3.1 Water chemistry measurements are made in situ at fixed river mile and strata locations. Surface and bottom measurements are made in the shoal strata, and surface, mid-depth, and bottom measurements are made in the channel strata. The number of stations per region and strata is indicated in Table II-10. For river run 1-3 only the water quality stations for regions 0-6 are sampled. For river runs 4-16 the water quality stations for regions 0-12 are sampled. For river runs 17-23 only the water quality stations in region 0-7 are sampled. The river mile and GPS coordinate for each of the fixed water quality stations are listed in Tables II-11 and II-12. The exact location of each sampling station is indicated on the sample site charts.

6.3.2 Descriptive data for each sampling location are recorded on the Hudson River Ichthyoplankton Survey Water Quality Data Sheet.

6.3.3 The boat is brought on station, and upon instruction from the Boat Captain, *in situ* water analyzer probes are lowered over the side. The appropriate length of cable is paid out so that surface (0.3m) measurements can be taken. After surface measurements are taken the probe is lowered to mid-depth, measurements taken, and then lowered to the bottom for measurements. Only surface and bottom readings are taken in the shoal strata.

6.3.4 Measurements of temperature, oxygen, and conductivity are made at each depth interval for each sampling location to the nearest 0.1°C, 0.1 mg/l, and scale division respectively.

NOTE: When reading the dissolved oxygen concentration with a D.O. meter, it is important to avoid recording inaccurate data that might occasionally occur due to meter malfunction or some other reason. To verify that the reading is reasonable for the ambient temperature and salinity conditions, refer to the following table to determine the saturation value for the tabulated temperature and conductivity closest to the temperature and conductivity observed in the field:

Ambient Temperature (°C)	Dissolved Oxygen Saturation Concentration (mg/l) For Various Values Of Observed Conductivities (µmho)				
	1000	2000	5000	10,000	20,000
0	14.6	14.5	14.3	14.0	13.4
4	13.1	13.0	12.9	12.6	12.7
8	11.8	11.8	11.6	11.4	11.0
12	10.7	10.7	10.6	10.4	10.0
16	9.8	9.8	9.7	9.5	9.2
20	9.1	9.0	8.9	8.8	8.5
24	8.4	8.4	8.3	8.1	7.9
28	7.8	7.8	7.7	7.6	7.3
32	7.3	7.3	7.2	7.1	6.8

Under normal conditions the D.O. should generally be close to the saturation value. In particular, the field value should not be higher than the saturation value, at least not by more than 1.0 mg/l or so. The only conditions under which higher values can be expected are near waterfalls or dense algal blooms. If the observed D.O. value is substantially different than the value in the table, then the reading should be taken again. If it is still questionable then a postcalibration should be performed on the meter upon return to the lab. If the postcalibration shows the meter to be out of tolerance then the questionable field readings should be deleted from the data.

6.3.5 Water quality data and ichthyoplankton samples are collected concurrently. No more than 2 hours should separate the collection of water quality data and the ichthyoplankton samples in the vicinity of the water quality station.

Table II-10. Water Quality Sampling Design for Hudson River Ichthyoplankton Survey

Region	River Mile		Sampling Stations			Number of Water Quality
	Interval	Length	East shoal	Channel	West shoal	Samples per Region
BT	1-11	12		4		12
YK	12-23	12	1	5	1	19
TZ	24-33	10	1	4	1	16
CH	34-38	5	1	4	1	16
IP	39-46	8	1	4	1	16
WP	47-55	9	-	4	-	12
CW	56-61	6	1	4	1	16
PK	62-76	15	-	4	-	12
HP	77-85	9	-	4	-	12
KG	86-93	8	-	4	-	12
SG	94-106	13	-	4	-	12
CS	107-124	18	-	4	-	12
AL	125-152	28	-	5	-	15
TOTAL			5	54	5	182

Table II-11. Locations of Fixed Water Quality Stations for Hudson River Ichthyoplankton Survey.

STA	REGION	RIV_MILE	SITE	STA	REGION	RIV_MILE	SITE
1	1	14	5	33	6	59	6
2	1	17	5	34	6	61	5
3	1	19	4	35	7	63	5
4	1	19	5	36	7	67	5
5	1	19	6	37	7	71	5
6	1	22	5	38	7	75	5
7	2	25	5	40	8	78	5
8	2	27	5	41	8	80	5
9	2	29	4	42	8	82	5
10	2	29	5	43	8	84	5
11	2	29	6	44	9	87	5
12	2	32	5	45	9	89	5
13	3	35	5	46	9	91	5
14	3	36	4	47	9	93	5
15	3	36	6	48	10	96	5
16	3	36	5	49	10	99	5
17	3	37	5	50	10	102	5
18	3	38	5	51	10	105	5
19	4	40	5	52	11	109	5
20	4	42	5	53	11	114	5
21	4	43	4	54	11	118	5
22	4	43	5	55	11	122	5
23	4	43	6	56	12	126	5
24	5	46	5	57	12	131	5
25	5	49	5	58	12	135	5
26	5	51	5	59	12	138	5
27	5	53	5	60	12	142	5
28	5	55	5	61	0	1	5
29	5	56	5	62	0	3	5
30	5	57	5	63	0	6	5
31	5	59	4	64	0	9	5
32	5	59	5	65	1	12	5

Table II-12. GPS Coordinates for Fixed Water Quality Stations.

Station	GPS Coordinates
1	N. 40°53.105 E. 73°55.972
2	N. 40°55.621 E. 73°54.945
3	N. 40°57.291 E. 73°54.828
4	N. 40°57.366 E. 73°54.242
5	N. 40°57.624 E. 73°53.703
6	N. 40°59.862 E. 73°53.754
7	N. 41°02.745 E. 73°52.875
8	N. 41°04.313 E. 73°53.118
9	N. 41°06.280 E. 73°54.434
10	N. 41°06.042 E. 73°52.902
11	N. 41°06.428 E. 73°52.372
12	N. 41°08.626 E. 73°53.069
13	N. 41°10.923 E. 73°55.798
14	N. 41°11.422 E. 73°56.902
15	N. 41°11.617 E. 73°55.857
16	N. 41°12.067 E. 73°56.589
17	N. 41°12.711 E. 73°56.982
18	N. 41°13.360 E. 73°57.242
19	N. 41°14.766 E. 73°58.191
20	N. 41°16.376 E. 73°57.495
21	N. 41°17.026 E. 73°57.410
22	N. 41°16.989 E. 73°56.877
23	N. 41°17.185 E. 73°56.633
24	N. 41°19.007 E. 73°58.921
25	N. 41°21.022 E. 73°57.586
26	N. 41°22.693 E. 73°57.301
27	N. 41°24.478 E. 73°57.908
28	N. 41°26.236 E. 73°58.827
29	N. 41°26.681 E. 73°59.509
30	N. 41°27.356 E. 74°00.147
31	N. 41°28.899 E. 74°00.509
32	N. 41°28.992 E. 74°00.157
33	N. 41°29.226 E. 73°59.559
34	N. 41°30.829 E. 73°59.986
35	N. 41°32.375 E. 73°59.371
36	N. 41°35.289 E. 73°57.355
37	N. 41°38.546 E. 73°56.909
38	N. 41°42.098 E. 73°56.745
39	Nonexistent
40	N. 41°44.820 E. 73°56.446
41	N. 41°46.211 E. 73°57.044
42	N. 41°48.147 E. 73°56.942
43	N. 41°49.790 E. 73°57.039
44	N. 41°52.282 E. 73°56.306

(continued)

Table II-12. (Continued)

Station	GPS Coordinates
45	N. 41°54.090 E. 73°57.738
46	N. 41°55.352 E. 73°57.414
47	N. 41°56.991 E. 73°57.539
48	N. 41°59.933 E. 73°56.594
49	N. 42°02.603 E. 73°55.780
50	N. 42°04.760 E. 73°55.692
51	N. 42°07.542 E. 73°54.876
52	N. 42°10.509 E. 73°52.484
53	N. 42°14.119 E. 73°50.674
54	N. 42°16.106 E. 73°47.365
55	N. 42°19.673 E. 73°47.068
56	N. 42°23.356 E. 73°47.418
57	N. 42°27.900 E. 73°47.007
58	N. 42°30.798 E. 73°46.237
59	N. 42°33.444 E. 73°45.263
60	N. 42°36.750 E. 73°45.640
61	N. 40°43.076 E. 74°01.575
62	N. 40°44.786 E. 74°01.034
63	N. 40°46.842 E. 73°59.833
64	N. 40°49.172 E. 73°58.349
65	N. 40°51.575 E. 73°56.767

6.4 HUDSON RIVER ICHTHYOPLANKTON SURVEY WATER QUALITY DATA SHEET

The water quality data sheet consists of the Q1 card type which is incorporated into the field data sheet (Figure II-5). Water quality data obtained at fixed stations are recorded on the field data sheet for the ichthyoplankton sample which is geographically closest to the water quality station. All codes and variables are described in detail in the Con Edison Data Dictionary. The term "Enter" appears in the data sheet coding instructions for all variables which require review of the data dictionary for appropriate codes. The term "Record" indicates no further information is required in order to complete the coding. The abbreviation N/A means the variable is not applicable to this study and is not entered or recorded.

6.4.1 Coding Instructions

Coding instructions for each card type are given below. Definitions for each variable and corresponding codes for each variable can be found in the Con Edison Data Dictionary. All entries should be made neatly with only one symbol per data block.

6.4.2 Coding for Water Quality Information

VARIABLE NAME	INSTRUCTIONS
TASK_CD	89 preprinted
SAMPLE	Enter assigned sample numbers from river charts

VARIABLE NAME	INSTRUCTIONS
DATE	Record month, day, and year
STA	Enter appropriate STA Code for site of collection (Table II-12).
H_2O_TEMP	Record water temperature to the nearest 0.1°C
D_O	Record dissolved oxygen to the nearest 0.1 mg/liter
pH	N/A
COND	Record conductivity to the nearest scale division
DEPTH_WQ	Record depth (in feet) at which the water quality sample was taken. Water quality readings should be taken 1 foot below the surface, mid depth, and 1 foot above bottom. Mid depth measurements are not made at shoal stations.

7.0 QUALITY CONTROL FOR FIELD STUDIES

Audits of epibenthic sled and Tucker trawl collection procedures and water quality data collection procedures will be conducted at least once per year by the Field Operations Manager. These audits will be conducted early in the project to monitor the daily performance of each technician.

8.0 EQUIPMENT CALIBRATION AND MAINTENANCE

8.1 YSI MODEL 57 DISSOLVED OXYGEN METER

8.1.1 Maintenance

8.1.1.1 Recharge or replace stirrer batteries every six months or when the BATT. CHECK reads 6 or less on the 0-10 scale. The instrument batteries are six "C" size carbon-zinc cells located inside the instrument on the water end.

8.1.1.2 Replace the probe's electrolyte fluid and membrane at one week intervals or when a bubble appears in the electrolyte.

8.1.2 Calibration

8.1.2.1 Calibration checks of the dissolved oxygen meter are performed at the beginning of a sampling day to maintain a field check on instrument performance and data quality.

8.1.2.2 Calibration checks of the dissolved oxygen measurement system will be performed using air saturated water. These checks will be performed in the following manner:

Prepare air saturated water by bubbling air into a carboy of distilled water for at least 30 minutes.

- Withdraw approximately 2 liters of air saturated water and pour it back and forth between two containers four to five times to remove any supersaturation.
- With the instrument control on OFF, check and adjust (if necessary) the meter mechanical zero.
- Prepare probe for operation and wait for at least 15 minutes for probe to stabilize.

- Adjust SALINITY knob to FRESH. (Important: all calibration and field readings are to be performed at this setting).
- Determine the temperature of the air saturated water with a calibrated thermometer.
- Switch the instrument control to RED LINE and adjust if necessary.
- Switch the instrument control to TEMP and determine the temperature of the air saturated water as indicated by the meter (this reading must agree with the standard thermometer within ±1°C).
- Switch the instrument control to zero and adjust if necessary.
- Use the air saturated water temperature to determine actual DO of water.
- Switch to the lowest DO scale that will include the reading (e.g., for an actual DO of 9.0 use the 0-10 scale, not the 0-20 scale).
- Place probe into air saturated water with the stirrer on, allow reading to stabilize and read the observed DO of air saturated water.
- Adjust meter to correspond to the actual DO of air saturated water.
- Record the following information in the DO-Meter Calibration Log:
- Date Calibrated
- Calibrated by
- Actual Temperature (Thermometer)
- Observed Temperature (Meter)
- Actual DO
- Observed DO
- Adjusted DO

8.2 YSI MODEL 33 S-C-T METER

8.2.1 Maintenance

Replace batteries every six months or when RED LINE adjustment cannot be accomplished. Remove the six screws from the rear plate to expose the batteries. Replace with two "D" size alkaline flashlight cells, not zinc-carbon "D" cells. The battery holders are color coded; the positive end must go on the red terminal.

8.2.2 Calibration

8.2.2.1 Calibration checks of both conductivity and temperature are performed at the beginning of a sampling day to maintain a field check on instrument performance and data quality.

8.2.2.2 Calibration checks of the conductivity and temperature measurement systems will be performed using standard KCl solution obtained from Normandeau's Standards Laboratory and a NIST traceable field thermometer. These checks will be performed in the following manner:

- With the mode control on OFF, check and adjust (if necessary) the YSI S-C-T Meter zero so that the meter needle lines up with the zero on the meter face.

- With the Mode Control on REDLINE, check and adjust (if necessary) the meter redline so that the meter needle lines up with the redline on the meter face.
- Record the bottle number of the Standard KCl solution used to check calibration in the S-C-T Meter Calibration Log.
- Obtain the actual temperature of the standard KCl solution with the NBS traceable field thermometer. Record this in the S-C-T Meter Calibration Log.
- Dry the S-C-T Meter probe as much as possible to avoid contamination of the standard KCl 1000 µmho/cm solution.
- Place the probe in the standard KCl solution.
- Turn the Mode Control to TEMPERATURE and record the observed temperature in the S-C-T Meter Calibration Log.
- Turn the Mode Control to the appropriate CONDUCTIVITY SCALE, hold the probe in the center of the standard KCl solution to obtain the highest reading and record the observed conductivity in the S-C-T Meter Calibration Log.
- Reduce the observed conductivity reading by 6% (i.e., multiply it by 0.94) for the long S-C-T cables (85-100 ft), or reduce it by 3% (multiply it by 0.97) when using 50 ft cables, and record the reduced conductivity underneath the original meter reading.
- Determine the actual conductivity by either interpolation utilizing the table on the standard KCl bottle or by means of the equation on the bottle and record this value in the S-C-T Meter Calibration Log.
- Determine the percent difference between the two conductivity readings using the following equation:

$$\frac{C_{obs} - C_{std}}{C_{std}} = \%$$

C_{obs} = observed conductivity (after correcting for cable length)

C_{std} = actual conductivity of standard

% = percent difference

8.2.2.3 If the percent difference between the conductivity readings exceeds ±5% or if the difference between the observed and standard temperatures exceeds ±1.0°C, the instrument is out of tolerance. The meter should be sent to the Standards Laboratory for repair and a second meter used that will pass a calibration check. The conductivity and/or temperature data obtained since the previous calibration check must be removed from the field data sheets and an EE/NC Report filed explaining the reasons for the missing data.

8.2.3 Standard KCl Solution

Standard KCl solutions should be changed after seven days of use.

8.3 GENERAL OCEANICS FLOWMETERS

It is essential that each flowmeter (digital and electronic) be calibrated and its fitness for field use evaluated. This should be performed upon acquisition before its first use in the field, and following each field use thereafter. This testing procedure is carried out by a qualified technician in the Horn Point Environmental Laboratory (HPEL) Flume. Data returned from HPEL subsequent to testing are used by the Data Center to calculate a regression equation for each flowmeter. By means of this equation, water velocity can be determined from field readings and ultimately, sample volume calculated. In addition, the precision of each of these meters is assessed from the HPEL data.

Digital and electronic flowmeters may be judged non-functional by field crews while in use. This decision may be based upon the instrument having sustained obvious physical damage prior to, or during use and after having passed the HPEL testing procedure, or upon one or more flow-meter field readings exceeding tolerance limits (Section 5.2.2.11).

8.3.1 Calibration Schedule

New flowmeters and functional units returned from the field after one week of use will be sent to HPEL for calibration.

8.3.2 Flowmeter Handling Procedures Related to Calibration

8.3.2.1 All new and functional (returned from the field after one week of use) digital and electronic flowmeters will be sent to HPEL at weekly intervals accompanied by adequate numbers of calibration data sheets.

8.3.2.2 This weekly frequency may be altered by the Field Operations Manager based on projected needs for calibrated flowmeters.

8.3.2.3 United Parcel Service will deliver flowmeters to HPEL and will return them to Normandeau the following week.

8.3.2.4 Flowmeters returned from HPEL will be retained by the Field Operations Supervisor until data evaluation has been completed.

8.3.2.5 Calibration data sheets will be checked by the Field Operations Manager for obvious errors, especially transpositional errors producing highly aberrant values. Errors will be treated as follows:

- If easily reconcilable, corrections will be made on the original and all copies with due notation of change.
- If not easily reconcilable, notation will be made of the fact, no further evaluation of those data will take place and the flowmeter will be assigned for recalibration. Data sheets found to contain errors will be retained by the Field Operations Manager and not sent to the Data Center.

8.3.2.6 The original data sheets will be submitted to the Data Center for processing.

8.3.2.7 The Data Center will calculate the regression equation and precision estimate for each digital flowmeter with the results distributed within four working days to the following:

- Original to the Technical Director.
- Copy to the Field Operations Manager.

8.3.2.8 The Field Operations Manager will be responsible for the evaluation of the status of newly calibrated flowmeters. The following criteria will apply:

- Individual digital flowmeters having a precision estimate greater than or equal to ±15 cubic meters will be considered unacceptable and removed from service for return to the vendor.
- Individual electronic flowmeters with readings differing from known flume velocities by more than 10% at 70, 80, or 90 cm/sec will be considered unacceptable and remove from service for return to the vendor.

8.3.2.9 Digital and electronic flowmeters determined to be acceptable will be made available for field assignment by the Field Operations Manager.

8.3.2.10 As flowmeters return from field use, they will be brought to the Field Operations Manager. At the same time a list of flowmeter numbers being submitted is to be provided with an indication of their status:

- Those apparently functioning properly based on field performance will be stored until they can be sent to HPEL.
- Those damaged but judged easily repairable will be repaired and subsequently sent to HPEL for calibration.
- Those considered non-functional on the basis of obvious damage or questionable field performance and judged to be not easily repairable will be stored until returned to the vendor.

8.3.2.11 The Field Operations Manager will maintain a log recording the history of each flowmeter. Included will be the following information:

- Identification number and vendor serial number.
- Date of receipt.
- Date and nature of each assignment.
- Date of service removal and reason for that removal.

8.3.2.12 Any problems or variance from these procedures will be documented by an EE/NC Report.

8.4 YSI MODEL 85 HANDHELD OXYGEN, CONDUCTIVITY, SALINITY AND TEMPERATURE SYSTEM

8.4.1 Maintenance

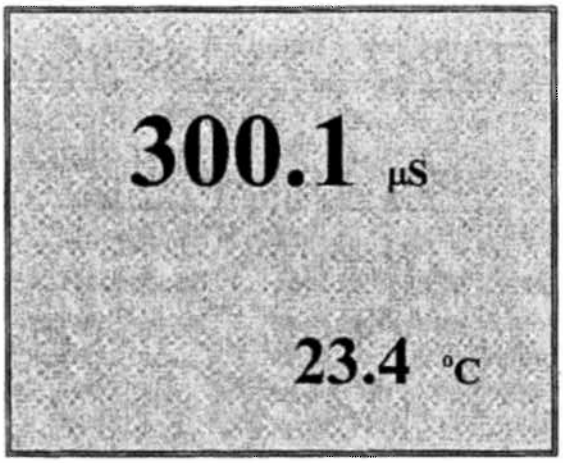
8.4.1.1 Maintain the Model 85 handheld water quality system as described in the YSI Model 85 operation manual in Appendix 1.

8.4.2 Calibration

8.4.2.1 Perform daily calibration of the YSI Model 85 handheld water quality system as described in the YSI Model 85 operations manual in Appendix 1.

8.4.3 Making Conductivity Measurements

8.4.3.1 Select **Conductivity** (not temperature compensated). The large numbers on the display will be followed by either a • **S** or an **mS**. Additionally the small portion of the display will show the • **C** **NOT** flashing.



8.5 YSI Model Professional Plus Handheld Oxygen, Conductivity, Salinity and Temperature System

8.5.1 Maintenance

8.5.1.1 Maintain the Model Professional Plus handheld water quality system as described in the YSI Model Professional Plus operation manual in Appendix 2.

8.5.2 Calibration

8.5.2.1 Perform daily calibration of the YSI Model Professional Plus handheld water quality system as described in the YSI Model Professional Plus operations manual in Appendix 2.

8.5.3 Making Conductivity Measurements

8.5.3.1 When using the YSI Professional Plus make sure you have selected Conductivity (the measure of a solutions ability to conduct electrical current). Conductivity reading is a reading without any temperature compensation.

III. ZEBRA MUSSEL TRANSFER PREVENTION PROCEDURES

With the confirmation of the zebra mussel in the Hudson River, the New York State Department of Environmental Conservation (NYSDEC) has established procedures to insure that vessels and equipment used in scientific sampling of the Hudson River be decontaminated to prevent spread of this organism to other bodies of water (i.e., New York City Reservoirs). Normandeau will begin implementing the NYSDEC transfer prevention procedures effective immediately.

The following decontamination policy will apply to all Normandeau boats that are presently being used, or may be used in the future outside of the Hudson River watershed, including, but not limited to, the Great Lakes, Susquehana, St. Lawrence, Lake Champlain, Connecticut, Merrimack or greater Mississippi drainages. Decontamination procedures should be used when transporting boats across watersheds in these states and provinces, or when transporting boats from these states and provinces to other areas.

Zebra mussels can be transported by boats by at least two methods. Settled zebra mussels can be transported on the surfaces of boats, trailers and sampling gear. Zebra mussel larvae and juveniles can be transported in bilge water, the outboard motor lower unit and cooling systems or any recessed area that may retain water. The primary method used to decontaminate surfaces that may harbor settled zebra mussels is desiccation. Parking a boat and trailer in full sunlight at temperatures greater than 70°F for 24-hours should be sufficient to decontaminate all exposed surfaces. If the temperature is less than 70°F the boat and trailer should left in the sunlight for a minimum of five days. If logistic considerations prevent dry storage of the boat and trailer prior to its next use, the boat, trailer and sampling gear should be pressure washed with water at temperatures greater than 140°F. This can be accomplished at most self service car washes using the high pressure rinse setting. All surfaces, including nets should be thoroughly sprayed with the high pressure hot water to remove settled zebra mussels. All vegetation and debris entangled on vehicles, trailers and boats should be removed. A decontamination log that details the location and time of the last use of the boat, and the time of decontamination should accompany each boat.

Areas that cannot be reached with the high pressure water gun, such as bilges, should be exposed to a chlorine solution with a concentration of 5 ppm. A chlorine concentration of 5 ppm can be made by adding about 10 ml of Clorox bleach to 5 gallons of water. The chlorine solution should be introduced to the bilge for at least ten minutes and then flushed out with clean tap water. Do not conduct chlorine decontamination where the chlorine solution may run directly into a receiving body of water. Sampling gear such as beach seines can be rinsed in the chlorine solution to remove zebra mussels. To prevent settling in outboard motors, or inadvertent transport, outboard motor cooling systems and lower units should be decontaminated by flushing with tap water. This procedure not only reduces the risk of inadvertent transport, but also reduces the risk of engine damage caused by entrained mussel larvae that may have metamorphosed and begun to foul the interior parts of the engine. The 5 ppm chlorine solution should be used to clean all sample bottles, meter probes and other devices used in short term, multiple water sampling programs.

IV. ENTERGY INDIAN POINT RADIOLOGICAL ENVIRONMENTAL MONITORING PROGRAM

1.0 PURPOSE

This procedure provides the instructions for obtaining and processing fish and blue crab samples for radiological analysis for the Entergy Indian Point Radiological Environmental Monitoring Program (REMP). These REMP fish samples are obtained opportunistically from regularly scheduled Ichthyoplankton or Fall Juvenile Survey samples and are meant to supplement a targeted sampling effort. The Standard Operating Procedures (SOP) for the Entergy Indian Point Targeted Radiological Environmental Monitoring Program is referred to in Appendix 2. A spring and summer REMP sample will be collected from the Indian Point (region 4) and Poughkeepsie regions (region 7) during the spring period of May 2 through June 17 and the summer period August 1 through September 16, 2011. The REMP Program Indian Point Region 4 starts at Grassy Point river mile 39 and ends at river mile 47 just above the Bear Mountain Bridge. The region encompasses 8 miles. The REMP Program Poughkeepsie Region 7 starts at the Newburgh-Beacon Bridge at mile 62 and ends 1 mile above the Mid-Hudson Bridge at river mile 77. The region encompasses 15 miles. Any required specimens of the REMP Program that are opportunistically collected during the spring or summer sampling periods from the Ichthyoplankton or Fall Juvenile Surveys will be handled and processed according to the procedures in The Entergy Indian Point Targeted Radiological Environmental Monitoring Program SOP referred to in Appendix 3.

V. LENGTH CLASS CUTOFFS FOR FIELD PROCESSING OF HUDSON RIVER FISH SPECIES

1.0 DESCRIPTION

Length class cutoff's are used in the Hudson River Program to differentiate young-of-the-year, yearling, and older fish without the need to record individual length measurements during field processing of each sample. In past surveys, weekly samples of key fish taxa were taken from the Hudson River and measured to the nearest mm total length (TL), and the resulting length-frequency distributions were examined to identify the two length class cutoffs or divisions, Division I the length separating young-of-the-year from the yearling age classes, and Division II separating the yearling from older age classes. Throughout the year, these two divisions or cutoffs are changed as the fish grow. Division I always represents the upper length limit for young-of-the-year fish for all species. During 1 January through 31 May, Division II represents the upper length limit for yearling fish for all species. From 1 June through 31 December, Division II is assigned a static value of 150 mm TL for all species *except* alewife (Taxon 01), American shad (Taxon 03), blueback herring (Taxon 22), striped bass (Taxon 30), Atlantic tomcod (Taxon 32) and white perch (Taxon 35). For these six fish taxa (01, 03, 22, 30, 32 and 35), Division II is maintained as a dynamic upper length limit and is changed as the yearling fish grow throughout the year. Table V-1 represents these Division I and Division II cutoff lengths for the six key fish species as they change during each sampling week in the 2010 survey. Refer to Normandeau's complete Yearling Division Cutoff List for each week in 2011 to find the Division I and Division II cutoff lengths used for taxa not listed in Table V-1.

Table V-1. Division I and Division II Length Cutoffs Representing the Separation of Young-of-the-Year, Yearling and Older Age Classes of Key Hudson River Fish Species during 2011.

River Run	Monday Date	Alewife		American Shad		Blueback Herring		Striped Bass		Atlantic Tomcod		White Perch	
		Div	Div II	Div	Div II	Div	Div II	Div	Div II	Div	Div II	Div	Div II
1	14-Mar	20	150	20	160	20	130	20	150	20	225	20	100
2	21-Mar	20	150	20	160	20	130	20	150	20	225	20	100
3	28-Mar	20	150	20	160	20	130	20	150	20	225	20	100
4	4-Apr	20	150	20	160	20	130	20	160	50	225	20	100
5	11-Apr	20	150	20	160	20	130	20	160	50	225	20	105
6	18-Apr	20	150	20	160	20	130	20	160	50	225	20	105
7	25-Apr	20	150	20	160	20	130	20	160	50	225	20	105
8	2-May	20	150	20	160	20	130	20	160	60	225	20	105
9	9-May	20	150	20	160	20	130	20	160	60	225	20	105
10	16-May	20	150	20	160	20	140	20	160	100	225	20	105
11	23-May	40	160	20	160	20	140	20	160	100	225	20	105
12	30-May	50	160	40	160	40	140	40	160	100	225	40	105
13	6-Jun	60	170	50	170	50	140	40	160	110	225	45	105
14	13-Jun	70	170	50	170	55	140	40	160	110	225	50	105
15	20-Jun	75	170	65	175	60	140	50	160	120	225	55	105
16	27-Jun	80	170	80	175	65	160	55	160	120	225	60	110
17	11-Jul	100	180	100	200	80	160	75	175	130	225	70	110
18	25-Jul	120	180	120	200	100	160	100	175	130	235	80	120
19	8-Aug	130	180	130	200	110	160	110	175	140	235	85	120
20	22-Aug	130	180	130	200	110	160	110	200	140	235	90	120
21	5-Sep	130	200	130	230	110	180	110	200	150	235	90	135
22	19-Sep	130	200	130	230	110	180	120	200	150	235	95	135
23	3-Oct	140	200	150	230	120	180	140	200	150	235	95	135

VI. NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION SCIENTIFIC COLLECTOR'S LICENSE

The valid New York State Department of Environmental Conservation scientific collector's license expiring on March 31, 2011 is shown in Figure VI-1.

Figure VI-1 will be replaced with a renewed permit when it becomes available.

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources - Special Licenses Unit
625 Broadway
Albany, NY 12233-4752
Phone Number (518) 402-8985
Fax Number: (518) 402-8925

NEW YORK STATE FISH AND WILDLIFE LICENSE

License Type: Collect or Possess — License Number: 77

Licensee:

MICHAEL J RICCI
NORMANDEAU ASSOCIATES INC
25 NASHUA RD
BEDFORD, NH 03110

Fee Amount: $10.00
Effective Date: 03/31/2010
Expiration Date: 03/31/2011
Region: 776 County:
Home Phone Number:
Business Phone Number: (603) 472-5191

DOB: 7/29/1952

Statutory Authority:

6NYCRR Part 175 ECL 11-0515

Page 1 of 3

Figure VI-1. New York State Department of Environmental Conservation Scientific Collectors License.

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources - Special Licenses Unit
625 Broadway
Albany, NY 12233-4752
Phone Number: (518) 402-8985
Fax Number: (518) 402-8925

NEW YORK STATE FISH AND WILDLIFE LICENSE

Conditions:

1. A. The licensee and/or designated agents are authorized to collect and possess fish and aquatic invertebrates, for the purposes of conducting the Long River Ichthyoplankton and Fall Juvenile fish studies for the Hudson River utilities from river mile 0-152 on the Hudson River. Collecting activities shall follow the submitted plan of study, subject to any amendments recommended by either the NYS DEC or USFWS

   B. The licensee and/or designated agents are authorized to collect the following finfish and benthic creatures, in the following numbers, from the Hudson River near Poughkeepsie (RM 62-76); Haverstraw Bay (RM 34-38); New York Harbor, Upper Bay; Jamaica Bay, New York Bight Apex and Long Island Sound in the vicinity of Eatons Neck within New York waters:
   216 bivalves
   135 blue crabs
   360 white perch
   108 American eels
   360 striped bass
   360 winter flounder

   C. The licensee and/or designated agents are authorized to collect and possess specimens from the Hudson River and nearby waters of the state of New York for tissue analysis as part of the New York/New Jersey Harbor Dredge project and must return all other specimens to the water at the site or in close proximity.

   D. The licensee and/or designated agents are further authorized to conduct a shellfish population surveys in the Atlantic Ocean offshore of Rockaway Point, Long Island in New York State waters in connections with a proposed application for a liquefied natural gas (LNG) deepwater port facility ("Safe Harbor Energy Island") and underwater pipeline

   E. All shellfish collected in accordance with condition 2D above shall be returned to the water at their point of capture following collection of data. Shellfish collected in uncertified water may not be released into certified water

   F. No endangered/threatened species may be possessed or retained pursuant to this license. Any endangered/threatened species incidentally collected shall be released alive immediately at their point of collection or, if dead, disposed with the Bureau of Marine resources, Finfish and Crustaceans Section, NYS DEC, 205 North Belle Meade road, Suite 1, East Setauket, NY 11733, (631) 444-0435. For the Long River Ichthyoplankton and Fall juvenile fish studies project, any endangered or threatened species shall be reported to either Regional Fisheries Manager in Region 3, 21 South Putt Corners Road, New Paltz, NY 12561 (845-256-3066) or Regional Fisheries Manager in Region 4, 65561 State Route 10, Stamford NY 12167 (607-652-7366).

   G. The licensee and/or designated agents shall notify the appropriate Regional Environmental Conservation Officer prior to all collection activities. If collection activities include the use of a vessel, the name, registration number and a description of the vessel must be provided in the notification along with a list of designated agents. Regional Law Enforcement telephone numbers are: Suffolk/Nassau, (631) 444-0250, New York City, (718) 482-4885; New Paltz, (845) 256-3013 and Schenectady, (518) 357-2047

   H. All collecting gear used pursuant to this license shall be marked with the licensee's name and license number. In the event that any gear is lost or stolen, the licensee shall report the loss of gear to the appropriate Regional Environmental Conservation Law Enforcement Office within 24 hours.

   I. The licensee may designate agents to conduct activities authorized by this license. Such designations must be in writing and the licensee must maintain an accurate list of agents he or she designates when conducting activities pursuant to this license.

   J. The licensee must submit and maintain an accurate written list of agents to the NYS DEC Special Licenses Unit BEFORE such agents conduct any activity pursuant to this license

   K. The licensee is responsible for all actions taken by his or her designated agents pursuant to this license.

   L. This license is not a license to trespass or disturb other fishing gear. The licensee and his or her designated agents must obtain permission from the appropriate landowner prior to conducting activities authorized pursuant to this license.

   M. The licensee shall file with the department on or before the expiration date of this license a report of activities for the Long river Ichthyoplankton and Fall juvenile fish studies for the Hudson River Utilities, conducted under this license during the preceding calendar year, or upon request for license renewal. For fish collections, this report will list, by collection date and gear, the number of specimens of each species collected and the disposition of such fish after collection. The licensee shall file with the Office of Special Licenses and Section Chief of Finfish and Crustaceans a report of activities during the preceding calendar year for the New York/New Jersey Harbor Dredge Project on or before January 31, 2011 and a final report at the end of the project collections. The report should include numbers and species caught by gear and a summary of any other data.

Figure VI-1. (Continued)

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources - Special Licenses Unit
625 Broadway
Albany, NY 12233-4752
Phone Number (518) 402-8985
Fax Number (518) 402-8925

NEW YORK STATE FISH AND WILDLIFE LICENSE

Conditions:

2. A. Please read all license conditions BEFORE conducting any activity pursuant to this license.

   B. The licensee assumes all liability and responsibility for any activities conducted under the authority of this license or any actions resulting from activities authorized by the license.

   C. This license may be revoked for any of the following reasons:
   i. licensee provided materially false or inaccurate statements in his or her application, supporting documentation or on required reports;
   ii. failure by the licensee to comply with any terms or conditions of this license;
   iii. licensee exceeds the scope of the purpose or activities described in his or her application for this license;
   iv. licensee fails to comply with any provisions of the NYS Environmental Conservation Law, any other State or Federal laws or regulations of the Department directly related to the licensed activity;
   v. licensee submits a check, money order or voucher for this license or application for this license that is subsequently returned to the Department for insufficient funds or nonpayment after the license has been issued.

   D. The renewal of this license is the responsibility of the licensee. This license is deemed expired on the date of expiration listed on the license unless otherwise notified by the Department.

   E. Direct all questions concerning this license to the Special Licenses Unit (518) 402-8985.

3. A. No endangered/threatened species may be collected or possessed pursuant to this license.

Figure VI-1. (Continued)

VII. STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION SCIENTIFIC COLLECTOR'S LICENSE

The valid State of New Jersey Department of Environmental Protection scientific collector's license expiring on December 31, 2011 is shown in Figure VII-1.

Date Issued: 02/18/11
Number: 1129

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

BOB MARTIN
Commissioner

Mail Code 501-03
Division of Fish and Wildlife
P.O. Box 420
Trenton, NJ 08625-0420
David Chanda, Director
www.NJFishandWildlife.com
(609) 292-2965

02/18/11 to 12/31/11

SCIENTIFIC COLLECTING PERMIT

TO WHOM IT MAY CONCERN:

Under provisions of New Jersey Statutes Annotated Title 23:4-52, permission is hereby given to:

Michael J. Ricci, Normandeau Associates, Inc., (for Indian Point Energy Center) 25 Nashua Road, Bedford, NH 03110 to collect striped bass, white perch, winter flounder, mummichog, polychaetes, shrimp, amphipods and zooplankton for preparation of the annual Hudson River Ichthyoplankton and Fall Juvenile Surveys Collection gear will include hook and line, minnow traps, 1.0 sq. m. Tucker trawl, 1.0 sq. m. epibenthic sled, 18' (head rope) mid-water trawl, 20' (foot rope) bottom trawl, 3m beam trawl, 100' beach seine, Ponar grab, 0.064 mm mesh plankton net, clam forks, small plankton nets and experimental gill nets (nets with a range of mesh sizes). Any associated by-catch of fish and crustaceans taken with the collection of the above species will be released immediately to the water. Collection will take place in the Upper New York Bay, Newark Bay, Harrison reach of Passaic River, Raritan and New York Bight from its apex (northwest corner) extending south 20 miles along New Jersey coast and east to New York border. See attached list of vessels to be used for collection.

This permit is subject, but not limited to, the following conditions:

1. The person(s) named herein shall have this permit in their possession when collecting scientific specimens in marine, fresh, or estuarine waters of the State and must present it upon request to any official or citizen.

2. The holder of this permit shall notify the Marine Law Enforcement Region Office of his/her scientific collecting activities in any of the State's marine, fresh, or estuarine waters at least 24 hours in advance of their activities. Notification can be made in writing to the Marine Enforcement Office, P.O. Box 418, Port Republic, NJ 08241, or by calling 609-748-2050.

3. A report of the organisms collected (species, numbers, specific location where taken, dates of sampling) or a final report for the study for which the permit is requested shall be sent to **Mail Code 501-03, Administrator, Marine Fisheries Administration, P.O. Box 420, Trenton, NJ 08625-0420**, within four (4) weeks of the expiration date or upon request for permit renewal, whichever is earlier.

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Figure VII-1. State of New Jersey Department of Environmental Protection Scientific Collectors License.

4. The provisions of this permit may not apply to any of the species listed by the United States Government as endangered. Special provisions may apply for certain of these endangered species.

5. This permit does not convey the right to trespass.

6. Violation by the permittee or subsidiary permit holders of any condition of the permit or any state law or regulation promulgated pursuant to N.J.S.A. 23 or 50 or N.J.A.C. 7:25 or 7:25A shall render this permit null and void and subject all parties to prosecution in addition to permit revocation upon conviction. Applications for future permits may also be denied.

7. The holder of this Scientific Collecting Permit is also required to have in his/her possession a "Special Permit for Research" from the Division of Watershed Management, Bureau of Marine Water Monitoring, P.O. Box 405, Leeds Point, NJ 08227, prior to the taking of shellfish (clams, oysters, mussels) for scientific purposes from the marine or estuarine waters of the State that are designated "Prohibited," "Special Restricted," or "Seasonal Special Restricted" (N.J.S.A. 58:24-3, and N.J.A.C. 7:12-2). A chart of these designated waters may be obtained from the Bureau of Marine Water Monitoring or by visiting www.nj.gov/dep/wms/bmw.

Thomas W. McCloy, Administrator
Marine Fisheries Administration

bd

c: Marine Enforcement Region Office
Mark Chicketano, Chief, Bureau of Law Enforcement
Lt. Chris Simmermom, NJ State Police
Deborah Watkins, Bureau of Marine Water Monitoring

Subsidiary Student or Employee Permit Holders:

See attached list

Figure VII-1. (Continued)

Subsidiary Permit Holders

Mark Mattson
Michael Ricci
Paul Geoghegan
B. Paul Lindsay
Charles Sweeney
Scott Schanke
Christopher Burnett
William Furman
Lawson Upchurch
Chris Ward
Ben Carson
Tim Magee
Tom Cunningham
Craig Tompkins
Chuck Porembski
Steve Kauffman
A.J. Spadavecchia
Joan Blan
Erik Fel'Dotto
Andrew Saltalamachia
Ryan Kellogg
Cory Francis
Michael Mettler

Vessel list for Permit # 1021 Renewal Permit #1129 for 2011

1. Document #1197389, W oody I, 1980 Bruno Stillman 42 foot lobster boat, fiberglass hull (white)
2. NH 0572 BF, 1983 Privateer (P2) 25 foot lobster boat, fiberglass hull (white)
3. NH 0373 BE, 1985 Privateer (P1) 25 foot lobster boat, fiberglass hull (white)
4. Document #589424, PANNAWAY, 37 foot Repco lobster boat, fiberglass hull (white)
5. NH 0571 BF, 1999 Alumaline 18 foot work boat, aluminum hull (gray)
6. NH 1616 BN 2007 Triton 20 foot center console, aluminum (green)
7. NH 6165 BM 1985 Privateer (P3) 25 foot lobster boat, fiberglass (white)

Figure VII-1. (Continued)

VIII. National Marine Fisheries Service Endangered Species Act Permit No. 1580

The valid National Marine Fisheries Service Permit to take Protected Species for Scientific Purposes, expiring on 31 March 2012, is shown in Figure VIII-1.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Silver Spring, MD 20910

MAR 29 2007

Permit No. 1580
Expiration Date: March 31, 2012
Reports Due: June 30, annually

PERMIT TO TAKE PROTECTED SPECIES[1] FOR SCIENTIFIC PURPOSES

I. Authorization

This permit is issued to Dynegy Northeast Generation, Inc. (hereinafter "Permit Holder"), 992-994 River Road, Newburgh, New York 12550, [Responsible Party: Martin Daley], pursuant to the provisions of the Endangered Species Act of 1973 (ESA; 16 U.S.C. 1531 et seq.), and the regulations governing the taking, importing, and exporting of endangered and threatened species (50 CFR Parts 222-226).

II. Abstract

The objectives of the permitted activity, as described in the application, are to evaluate the life history, population trends, and spatial, temporal, and size distribution of shortnose sturgeon (*Acipenser brevirostrum*) collected during the annual Hudson River Biological Monitoring Program (BMP). This program is conducted in compliance with the regulatory requirements of the Clean Water Act, and those set forth by the State Pollution Discharge Elimination System (SPDES) permit possessed by the Permit Holder.

III. Terms and Conditions

The activities authorized herein must occur by the means, in the areas, and for the purposes set forth in the permit application, and as limited by the Terms and Conditions specified in this permit, including all attachments and appendices. Any permit noncompliance constitutes a violation and is grounds for permit modification, suspension, or revocation, and for enforcement action.

A. Duration of Permit

1. Personnel listed in Condition C.1 of this permit (hereinafter "Researchers") may conduct activities authorized by this permit through March 31, 2012. This permit expires on the date indicated and is non-renewable. This permit may be extended by the Director, NMFS Office of Protected Resources, pursuant to applicable regulations and the requirements of the ESA.

[1] "Protected species" include species listed as threatened or endangered under the ESA, and marine mammals.

2. Researchers must suspend all permitted activities in the event serious injury[2] or mortality[3] of shortnose sturgeon reaches that specified in Appendix 1. The Permit Holder must contact the Chief, NMFS Permits, Conservation and Education Division (hereinafter "Permits Division") by phone (301-713-2289) within two business days. The Permit Holder must also submit a written incident report as described in Condition E.2. The Permits Division may grant authorization to resume permitted activities based on review of the incident report and in consideration of the Terms and Conditions of this permit.

3. If authorized take[4] is exceeded, Researchers must cease all permitted activities and notify the Chief, Permits Division by phone (301-713-2289) as soon as possible, but no later than within two business days. The Permit Holder must also submit a written incident report as described in Condition E.2. The Permits Division may grant authorization to resume permitted activities based on review of the incident report and in consideration of the Terms and Conditions of this permit.

B. Number and Kind(s) of Protected Species, Location(s), and Manner of Taking

1. The table in Appendix 1 outlines the number of shortnose sturgeon authorized to be taken and the locations, manner, and time period in which they may be taken.

2. Researchers working under this permit may collect visual images (i.e., any form of still photographs and motion pictures) as needed to document the permitted activities, provided the collection of such images does not result in takes of protected species.

   a. The Permit Holder may use these images in printed materials (including commercial or scientific publications) and presentations provided the images are accompanied by a statement indicating that the activity depicted was conducted pursuant to Permit No. 1580. This statement must accompany the images in all subsequent uses or sales.

   b. Annual reports required pursuant to Condition E.3 must note such incidental scientific, educational, or commercial uses of the images.

3. Upon written request from the Permit Holder, approval for photography, filming, or audio recording activities not essential to achieving the objectives of the permitted activities, including allowing personnel not essential to the research

[2] A serious injury is defined by regulation as any injury that will likely result in mortality.
[3] This permit does not allow for unintentional serious injury and mortality caused by the presence or actions of researchers. This includes, but is not limited to; deaths of dependant young by starvation following research-related death of a lactating female; deaths resulting from infections related to sampling procedures; and deaths or injuries sustained by animals during capture and handling, or while attempting to avoid researchers or escape capture.
[4] Under the ESA, a take means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to do any of the preceding.

(e.g. a documentary film crew) to be present, may be granted by the Chief, Permits Division.

a. Where such non-essential photography, filming, or recording activities are authorized they must not influence the conduct of permitted activities in any way or result in takes of protected species.

b. Personnel authorized to accompany the Researchers during permitted activities for the purpose of non-essential photography, filming, or recording activities are not allowed to participate in the permitted activities.

c. Annual reports required pursuant to Condition E.3 must note such non-essential activities.

d. The Permit Holder and Researchers cannot require or accept compensation in return for allowing non-essential personnel to accompany Researchers to conduct non-essential photography, filming, or recording activities.

4. Researchers must comply with the following conditions related to the manner of taking:

a. Capture

i. Ichthyoplankton, beam, and otter trawl nets:

1. Nets must be towed at a maximum speed of 5 miles per hour for no more than 10 minutes.

2. A depth sounder must be used to monitor the bottom characteristics. If the net becomes snagged (on bottom substrate, debris, etc.), it must be untangled immediately to reduce stress on the animals.

3. A Global Positioning System (GPS) must be used to determine the coordinates of each tow. Trawling over the same exact location more than once in a 24 hour period is not permitted.

ii. Beach seine:

1. Seining must be conducted only in areas of smooth substrate.

b. Handling

i. Handling time of shortnose sturgeon must not exceed 15 minutes.

ii. Fish must be handled with care and kept in water to the maximum extent possible during sampling and processing procedures. To reduce stress, all fish handled out-of-water must be transferred using a sanctuary net that holds water during transfer.

iii. For weight measurements, sturgeon must be supported using a sling or net and handling should be minimized throughout the procedure. Smooth rubber gloves must be worn to reduce abrasion of skin and removal of mucus.

iv. Before release, fish must be treated with an electrolyte bath to help reduce stress and restore slime coat.

c. Holding

i. Total holding time of any shortnose sturgeon, after removal from the net, must not exceed two hours when water temperatures are $\leq 27^{\circ}C$; if temperatures are $\geq 27^{\circ}C$, holding of shortnose sturgeon must not exceed 30 minutes.

ii. Sturgeon must be held in floating net pens or live cars during processing.

iii. When fish are onboard the research vessel, they must be placed in flow-through tanks that allow for total replacement of water volume every 15-20 minutes. Dissolved oxygen levels in holding tanks must be maintained above 5 ppm.

iv. To remove chlorine, thoroughly flush holding tanks sterilized with bleach between sampling periods.

d. Genetic Sampling

i. Collection of genetic samples (fin clip) must be coordinated with Julie Carter (NOAA-NOS) (843)762-8547.

ii. Extreme care must be used when collecting genetic samples. Instruments must be sterilized and gloves must be changed between each fish sampled to avoid possible disease transmission or cross contamination of genetic material.

e. Tagging

i. Prior to placement of PIT tags, the entire dorsal surface of each fish must be scanned with a PIT tag reader to ensure detection of fish tagged in other studies. Previously tagged fish must not be retagged.

ii. PIT tags must be inserted immediately anterior to the dorsal fin of the sturgeon.

iii. Researchers would not insert PIT tags larger than 11.5 mm x 2.1 mm into juvenile shortnose sturgeon less than 330 mm in length.

iv. Shortnose sturgeon less than 250 mm (10 inches) must not be tagged.

v. Total weight of all tags (internal and external) must not exceed 2% of the fish's total body weight.

f. Atlantic Sturgeon

i. If an Atlantic sturgeon is incidentally captured, it must be PIT tagged (according to the procedures indicated above), genetically sampled (1 cm^2 pelvic fin clip), and released.

ii. The Permit Holder must report any sturgeon interactions to Northeast Regional Office, NMFS, Kim Damon Randall at 978-281-9300 x6535; Kimberly.Damon-Randall@noaa.gov. This report must contain: the description of the take, location, and final disposition of the sturgeon (i.e., released in good health, etc.).

C. Qualifications, Responsibilities, and Designation of Personnel

1. The following Researchers may participate in the conduct of the permitted activities in accordance with their qualifications and the limitations specified herein:

a. Responsible Party – Martin Daley;

b. Principal Investigator – Mark Mattson; and

c. Co-Investigator(s) – Michael Ricci, Christopher Burnett, Charles Sweeney, Scott Shanke, William Furman.

2. Individuals conducting permitted activities must possess qualifications commensurate with their roles and responsibilities. The roles and responsibilities of personnel operating under this permit are as follows:

a. The Permit Holder is ultimately responsible for all activities of any individual who is operating under the authority of this permit. Where the Permit Holder is an institution/facility, the Responsible Party is the person at the institution/facility who is responsible for the supervision of the Principal Investigator.

b. The Principal Investigator (PI) is the individual primarily responsible for the taking, import, export and any related activities conducted under the

permit. The PI must be on site during any activities conducted under this permit unless a Co-Investigator named in Condition C.1 is present to act in place of the PI.

c. Co-Investigators (CIs) are individuals who are qualified to conduct activities authorized by the permit without the on-site supervision of the PI. CIs assume the role and responsibility of the PI in the PI's absence.

d. Research Assistants (RAs) are individuals who work under the direct and on-site supervision of the PI or a CI. RAs cannot conduct permitted activities in the absence of the PI or a CI.

3. Personnel involved in permitted activities must be reasonable in number and essential to conduct of the permitted activities. Essential personnel are limited to:

a. Individuals who perform a function directly supportive of and necessary to the permitted activity (including operation of any vessels or aircraft essential to conduct of the activity);

b. Individuals included as backup for those personnel essential to the conduct of the permitted activity; and

c. Individuals included for training purposes.

4. Persons who require state or Federal licenses to conduct activities authorized under the permit (*e.g.*, veterinarians, pilots) must be duly licensed when undertaking such activities.

5. Permitted activities may be conducted aboard vessels or aircraft, or in cooperation with individuals or organizations, engaged in commercial activities, provided the commercial activities are not conducted simultaneously with the permitted activities, except with written approval pursuant to Condition B.3.

6. The Permit Holder may request authorization from the Chief, Permits Division to add personnel to this permit as indicated below. The Permit Holder cannot require or receive any direct or indirect compensation in return for requesting authorization for such person to act as a PI, CI, or RA under the permit.

a. The Permit Holder or PI may add or remove CIs from the permit by submitting a written request to the Chief, Permits Division. Where the Permit Holder is an institution/facility, the Responsible Party may request a change of PI. Requests to change the PI or add CIs must include a description of the individual's qualifications to conduct and oversee the activities authorized under this permit.

D. Possession of Permit

1. This permit cannot be transferred or assigned to any other person.

2. The Permit Holder and all other persons operating under the authority of this permit must possess a copy of this permit: when engaged in a permitted activity; when a protected species is in transit incidental to a permitted activity; and during any other time when any protected species taken under such permit is in the possession of such persons.

3. A duplicate copy of this permit must be attached to the container, package, enclosure, or other means of containment in which a protected species or protected species part is placed for purposes of storage, transit, supervision or care.

E. Reports

1. The Permit Holder must submit annual, final, and incident reports, and any papers or publications resulting from the research authorized herein to the Chief, Permits Division, Office of Protected Resources, NMFS, 1315 East-West Highway, Suite 13705, Silver Spring, MD 20910; phone (301) 713-2289; fax (301) 427-2521.

2. Written incident reports related to serious injury and mortality events or to exceeding authorized takes, must be submitted to the Chief, Permits Division within two weeks of the incident. The incident report must include a complete description of the events and identification of steps that will be taken to reduce the potential for additional research-related mortality or exceedance of authorized take.

3. An annual report must be submitted to the Chief, Permits Division by June 30 for each year the permit is valid. The annual report describing activities conducted during the previous permit year must follow the format in Appendix 2.

4. A final report must be submitted to the Chief, Permits Division within 180 days after expiration of the permit (September 30, 2012), or, if the research concludes prior to permit expiration, within 180 days of completion of the research. The final report must follow the format in Appendix 2.

5. Research results must be published or otherwise made available to the scientific community in a reasonable period of time.

F. Notification and Coordination

1. The Permit Holder must provide written notification of planned field work to the appropriate Assistant Regional Administrator for Protected Resources at the address listed below. Such notification must be made at least two weeks prior to initiation of any field trip/season and must include the locations of the intended field study and/or survey routes, estimated dates of research, and names and roles of participants (i.e., all CIs and Research Assistants).

   Northeast Region, NMFS, One Blackburn Drive, Gloucester, MA 01930-2298; phone (978) 281-9300; fax (987) 281-9394.

2. To the maximum extent practical, the Permit Holder must coordinate permitted activities with activities of other Permit Holders conducting the same or similar activities on the same species, in the same locations, or at the same times of year to avoid unnecessary disturbance of animals. The appropriate Regional Office may be contacted at the address listed above for information about coordinating with other Permit Holders.

G. Observers and Inspections

1. NMFS may review activities conducted pursuant to this permit. At the request of NMFS, the Permit Holder must cooperate with any such review by:

   a. Allowing any employee of NOAA or any other person designated by the Director, NMFS Office of Protected Resources to observe permitted activities; and

   b. Providing any documents or other information relating to the permitted activities.

H. Modification, Suspension, and Revocation

1. All permits are subject to suspension, revocation, modification, and denial in accordance with the provisions of subpart D [Permit Sanctions and Denials] of 15 CFR part 904.

2. The Director, NMFS Office of Protected Resources may modify, suspend, or revoke this permit in whole or in part:

   a. In order to make the permit consistent with any change made after the date of permit issuance with respect to any applicable regulation prescribed under section 4 of the ESA;

b. In any case in which a violation of the terms and conditions of the permit is found;

c. In response to a written request[5] from the Permit Holder;

d. If NMFS determines that the application or other information pertaining to the permitted activities (including, but not limited to, reports pursuant to Section E of this permit and information provided to NOAA personnel pursuant to Section G of this permit) includes false information; and

e. If NMFS determines that the authorized activities will operate to the disadvantage of threatened or endangered species or are otherwise no longer consistent with the purposes and policy in Section 2 of the ESA.

3. Issuance of this permit does not guarantee or imply that NMFS will issue or approve subsequent permits or amendments for the same or similar activities requested by the Permit Holder, including those of a continuing nature.

I. Penalties and Permit Sanctions

1. Any person who violates any provision of this permit, the ESA, or the regulations at 50 CFR 222-226 is subject to civil and criminal penalties, permit sanctions, and forfeiture as authorized under the ESA, and 15 CFR part 904.

2. NMFS shall be the sole arbiter of whether a given activity is within the scope and bounds of the authorization granted in this permit. The Permit Holder must contact the Permits Division for verification before conducting the activity if they are unsure whether an activity is within the scope of the permit. Failure to verify, where NMFS subsequently determines that an activity was outside the scope of the permit, may be used as evidence of a violation of the permit, the ESA, and applicable regulations in any enforcement actions.

[5] The Permit Holder may request changes to the permit related to: the objectives or purposes of the permitted activities; the species or number of animals taken; and the location, time, or manner of taking or importing protected species. Such requests must be submitted in writing to the Chief, Permits Division in the format specified in the application instructions.

J. Acceptance of Permit

1. In signing this permit, the Permit Holder and Principal Investigator:

a. Agree to abide by all terms and conditions set forth in the permit, all restrictions and relevant regulations under 50 CFR Parts 222-226, and all restrictions and requirements under the ESA;

b. Acknowledge that the authority to conduct certain activities specified in the permit is conditional and subject to authorization by the Office Director; and

c. Acknowledge that this permit does not relieve the Permit Holder of the responsibility to obtain any other permits, or comply with any other Federal, State, local, or international laws or regulations.

James H. Lecky for
Director, Office of Protected Resources
National Marine Fisheries Service

3/29/2007
Date

Martin Daley
Senior Director-Regulatory and Administrative Services
Dynegy Northeast Generation, Inc.
Responsible Party

4/16/07
Date

Mark Mattson
Vice President/Principal Aquatic Ecologist
Normandeau Associates, Inc.
Principal Investigator

27 April 2007
Date
NOTE modified dates in Appendix 1 And Appendix 2 Attached.
MTM 27Apr-07

Appendix 1
Authorized Takes

82	shortnose sturgeon (*Acipenser brevirostrum*)	juvenile & adult	male & female	capture, handle, measure, weigh, scan for tags, PIT tag, Carlin tag, photograph, tissue sample, and release	Hudson River, NY (Battery Park – RM 152)	January - December
40	shortnose sturgeon (*Acipenser brevirostrum*)	larvae	male & female	lethal take	Hudson River, NY (Battery Park – RM 152)	March – December

Appendix 2
Protected Species Research or Enhancement Permit
Report Form

Date: _____ **Reporting Period:** _____

Permit Number: _____ **Permit Holder's Name:** _____

Contact Name: _____ **Contact Email:** _____
Contact Phone #: _____
(Contact = person submitting report)

Part I: Take Table. Enter the actual number of animals taken during this reporting period.

82		shortnose sturgeon (*Acipenser brevirostrum*)	juvenile & adult	male & female	capture, handle, measure, weigh, scan for tags, PIT tag, Carlin tag, photograph, tissue sample, and release	Hudson River, NY (Battery Park – RM 152)	January - December
40		shortnose sturgeon (*Acipenser brevirostrum*)	larvae	male & female	lethal take	Hudson River, NY (Battery Park – RM 152)	March – December

NOTE: If you conducted activities or took protected species for which you were not authorized, you must enter them on separate lines of the table and explain exactly what happened (see Part II below).

Part II: Narrative. Briefly provide the following information:

Effects permitted activities had on animals, including any unforeseen responses or effects.

Measures taken to minimize effects of permitted activities on animals and the effectiveness of these measures.

The physical condition of animals taken and used in the permitted activities.

How permitted species were unintentionally injured or killed and how they were disposed.

Any problems that were encountered during the permitted activities and any steps taken or proposed to resolve such problems.

Steps taken to coordinate the permitted activities with other permit holders.

Summarize any preliminary findings. Did you accomplish the goals of your permitted activities?

List titles of reports, publications, etc. resulting from this reporting period. Attach copies of any final documents as available. If these documents are not yet available, indicate when you anticipate that they will be completed and submitted. When reports and publications are available, send to the Chief, Permits Division, and include the permit number in subject line.

Number and type of non-permitted species caught, harassed, or otherwise taken, and the observed effects of such taking.

Any incidental photography or filming.

Any additional findings, results, or information you would like to report or comment on.

If you have any questions, please contact the permit analyst listed on the cover letter of your permit. Please submit this form electronically to the same permit analyst.